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Monographs of South American Basidiomycetes, Especially Those of the East Slope of the Andes and Brazil

1. The Genus *Pluteus* in South America*

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The present paper is intended to be the first of a series of monographs and regional floristic treatments of various groups of fungi, especially Agaricales and some other groups of Basidiomycetes, but according to the available material of all classes of fungi with special emphasis on the Yungas region [East slope of the Bolivian Andes, and its extension to the North (Peru) and South (Argentina)] and the Amazonas basin. These publications are the outgrowth of a project concerned with the exploration of the mycoflora of South America which had until 1956 been concerned particularly with the "spheres of influence" of the two most fertile writers and collectors of mycological material: Carlos Spegazzini and João Rick, a zone of the continent which might be roughly characterized as Southern South America. In 1956 the author had the opportunity to extend his mycological exploration work further to the North of the Continent in an effort to join eventually, in a geographical sense, and coordinate his work with that now started by Dennis in Trinidad and Venezuela.

The opportunity offered was a grant from the National Science Foundation, Washington D.C., U.S.A., for mycological field work in the Yungas and Amazonas regions of Bolivia and Brazil, which made it possible to collect considerable numbers of specimens of fungi which are now in the process of laboratory analysis at the Instituto Miguel Lillo. This work was partially sponsored by the Fundación Miguel Lillo, Tucumán, Argentina. The necessary expeditions were undertaken with the help of the Ministerio de Agricultura and the Servicio Agrícola Interamericano, La Paz, Bolivia, in company of my assistant Mr. Elías Ramón de la Sota who collected host plants and provided determinations of the host species of difficult identity, and likewise

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collected a number of vascular plants for the herbarium of the Fundación. To the organizations mentioned the author expresses his gratitude.

The Yungas region of Bolivia was thus far mycologically practically unknown. This region has phytogeographically much in common with the East slope of the Andes further north as well as with the poorer but similar flora of the Selva Tucumano-Boliviana which extends to the South, and had been studied before by the author, and the results published in a paper by Singer & Digilio (1952).

The Amazonas region visited, particularly the region of the rivers Mamoré, Beni, Madre de Dios, at their confluence into the Rio Madeira, is one of the most typical and interesting regions of the Amazonas Basin which had been visited by Weir before the Second World War so that a number of polypore collections made by him found their way in the herbaria (FH, LIL), but other fungi had never been collected in this part of South America. Due to the relative uniformity of the Amazonas mycoflora, it may be assumed that the mycoflora of the Territories, resp. Departamentos of Guaporé, Beni, and Pando is similar and comparable to that of the lower Rio Juruá where Ule collected material later determined and distributed by Hennings and Ule, and to a certain degree also to the classical localities visited more than a hundred years ago by Spruce further north along the Rio Negro from where Berkeley obtained the original material of his novelties from the Amazonas region.

Because of the scarcity of collections especially of well annotated and duly labeled material of fungi from the Yungas and Amazonas regions, the collections treated here are the first collections obtained in the course of a systematic attempt to exhaust, to a reasonable degree, the mycoflora as it appears during a rainy season in those parts, and in order to do so, collecting was continued during a period of $3\frac{1}{2}$ months, i.e., from January until April.

The order in which the contributions will appear is not a taxonomic one. It would be impractical to wait for the termination of the entire work and it would also be impossible to organize the work according to the position of each genus in the presently accepted classifications. Instead, the author will present the papers according to the feasibility which is determined by the existence of material, the state of knowledge of each group, and the cooperation offered by other mycologists.

The author will present a monograph of *Pluteus* and *Marasmius* as well as several smaller genera of Agaricales to start with because those genera were recently revised with a special emphasis on types from South America. Fortunately, it has been possible to receive assurance of cooperation from such important specialists as Dr. R. W. G. Dennis, P. Heinemann, R. F. Korf, J. Lindquist, M. Locquin, B. Lowy, E. Mains, G. W. Martin, F. Petrak, D. A. Reid, H. Romagnesi, A. H. Smith, W. H. Snell, J. A. Stevenson, and J. E. Wright. Summaries of the floristic contents of papers by these mycologists published in other serial publications or in books will be included in the present series.

Although published data are available on the climatic conditions of the regions which yielded the bulk of the material from Brazil, Argentina (Prov. of Tucumán, Misiones, Patagonia, Gob. Tierra del Fuego), and the Bolivian Yungas, no published accounts of rainfall

and temperature exist for that part of the Amazonas region where all our own collections were obtained, i.e., near the confluence of Rio Madre de Diós, Beni, and Rio Mamoré (to form the Rio Madeira). Through the courtesy of Dr. D. Robertson we are in a position to give some data on rainfall and temperature in Riberalta, a large settlement more or less in the center of this region.¹

These data, with very small variations, are valid for the entire region visited by us within the province of Vaca Díez in Bolivia, the Bolivian part of the forests along the Madre de Diós up to Conquista, and the Brazilian Territory of Guaporé around Guajará mirim.

TABLE 1.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Seven year average of rainfall in inches....	11.2	9.8	8.8	3.6	1.8	0.6	1.1	0.7	2.5	6.8	8.2	10.5	65.6
1955 rainfall (inches)...	11.8	7.7	9.6	5.6	1.0	0.7	0.3	1.5	1.4	6.4	3.1	14.9	64.0
1956 rainfall (inches)...	4.7	5.2											
1955 average maximum temperature °C....							29.6	33.1	32.9	32.5	31.4	30.6	
1956 average maximum.	30.6	31.2											
Average minimum.	20.6	20.2					14.7	17.9	20.1	19.8	21.4	21.1	
	(19 56)	(19 56)							(19 55)	(19 55)			
Absolute maximum.	33.5	32.5					33.5	35.5	35.5	35.5	35.0	33.5	
	(19 56)	(19 56)							(19 55)	(19 55)			
Absolute minimum.	19.5	18.5					7.0	15.0	18.0	14.5	20.0	18.5	
	(19 56)	(19 56)							(19 55)	(19 55)			

PLUTEUS Fr., Genera Hymenomycetum, p. 6. 1836.

Type species: *Agaricus pluteus* Batsch ex Fr. (synonymis exclusis) = *Pluteus cervinus* (Schaeff. ex Secr.) Kummer.

The genus *Pluteus* is a genus of the family Amanitaceae, tribus Pluteae.² This tribus is characterized by the character, unique among the Agaricales, of an inverse hymenophoral trama, and the genus *Pluteus* is characterized by the absence of a free volva-cup or lobes and the absence of an annular veil.

This division of a group into genera based on veil characters has not given good results in terms of natural genera in other groups of the Agaricales. Nevertheless, in the Pluteae, this criterion was maintained

¹I wish to thank Dr. Robertson not only for his meteorological collaboration but for his extraordinary helpfulness, his good advice, and his unreserved and unforgettable hospitality.

²Some authors separate the Pluteae as a family from the Amanitaceae; this family is then referred to as Volvariaceae (Volvariées).

even in the most modern classifications, and it may be said that until now, no doubts have been cast on the naturalness of the genera resulting. Even so, our investigations on South American species of *Pluteus* have revealed the presence of a reduced fragmentary volval formation in some species of *Pluteus*. These species are obviously not representatives of *Volvariella*, for two reasons: (1) There is no visible affinity between them and species of *Volvariella* and there are no transitions of a morphological nature connecting the indistinct volval formations in these species with the constantly well formed volval cup of the *Volvariellas*. (2) There is a very distinct connection between the species mentioned on one hand and certain groups of *Plutei* on the other; in particular, *Pluteus stephanobasis* is closely related to *P. xylophilus*, both having metuloids and cheilocystidia of the same kinds, organs either not occurring in *Volvariella*, or in a strongly differing type. Consequently, I have not hesitated to leave these "veiled" *Plutei* in the genus *Pluteus*, combined with the respective section and subsection where they belong according to their other characters. I have not felt that the generic taxonomy of the tribus has been influenced by these finds, just the same as the generic taxonomy of *Russula* has remained unchanged in spite of the addition of veiled tropical species to that genus.

In order to study the South American *Plutei*, it was first necessary to become thoroughly acquainted with the species already known in *Pluteus* either from South America or elsewhere, and thus gain enough insight into the systematics of the group to be able to monograph those of a continent generally neglected in *Pluteus* studies, but extraordinarily rich in species. Indeed, the representation of *Pluteus* in the flora of South America is such that *Pluteus* must be considered one of the most important genera of Agaricales in that continent, in variation as well as in mere number of individuals in any given region. The reason for the neglect of the genus in earlier exploration work (except for that of Singer & Digilio carried out in Argentina, and that of Dennis in Trinidad) may be sought in the fact that (1) both Rick and Spegazzini did not know the genus very well, and for that reason misdetermined it often (some of Rick's specimens turned out to be *Acurtis* (= *Rhodophyllus*), etc., while Spegazzini described some *Plutei* in other genera), and (2) other collectors who were not residents of South America for at least a time, did not collect at the appropriate time, nor did they have the means to annotate and prepare specimens of this fleshy to membranous-fragile material in such a form as to make it useful for further study and worth while to be deposited in one of the public herbaria.

While there is in reality no difficulty whatsoever in the recognition of a *Pluteus*, its annotation and preparation are extremely important. The easy preparation and the relative persistence of the characters of the fresh specimens in *Marasmius* have caused that genus to be much more represented in the herbaria of South American fungi than *Lepiota* or *Pluteus* which are just as important elements of the mycoflora.

In order to be able to study the systematics of the genus, we had to add a few characters to the ones used since the times of Fries and Fayod, particularly a more detailed study of the cystidial types and the structure of the epicutis of the pileus, the pigments, the exact shape

of the spores, and such additional characters of great importance as the presence or absence of clamp connections.

With these tools at hand, it was much easier to approach the study of types.

In a preliminary paper on the existing species of *Pluteus*, (Singer 1956), I have attempted to lay the groundwork for later monographic studies. Anatomical studies on *Pluteus* have not been exhaustive, as additional anatomical characters can still be discovered. On the contrary, I believe, according to a few data obtained by me but not consistently enough in all species, that the structure of the subhymenium and the hypodermium in *Pluteus* has some significance and may help elucidate some problems on the specific level. Likewise, the structure of the surface layer of the stipe may, in some cases where this has been neglected thus far, add additional valuable criteria. Nevertheless, I am convinced that the classification of the species adapted here—a slight modification of the preliminary system proposed by this author (1956) which in turn was but a slight modification of the classification used by Fayod, Lange and Kühner & Romagnesi—represents the main features of the genus and the natural affinities of its subdivisions and stirpes and reflects the wealth of forms present in this Continent.

It must be kept in mind that many species and forms are known only from limited material. Many species of *Pluteus* in South America occur in a rather isolated solitary form. For that reason I have not seen fit to propose a taxon for every collection that might seem to deserve it although I have, in the more striking cases, used the term "varietas" for some of the aberrant types inasmuch as this status, according to my definition (Singer 1941) has a temporary character. If there was any doubt about the validity of a separation at all, and the separation had to be made in the interest of the general presentation and completeness, the resulting units were proposed "ad interim."

The material at hand was nevertheless too large to be left for some future date when still more collections would be at our disposal. On the contrary, I believe that the availability of a monograph—as incomplete as it may be—will greatly facilitate and stimulate future studies particularly in regions thus far little known such as Colombia and adjacent areas. Even in the enormous extenses of the Amazonas despite months of intensive collecting, we cannot hope to have found more than a fair representation of the agaric flora, and new species will continue to be discovered there as elsewhere.

The color of the spore print has been omitted from the formal descriptions since there does not seem to be enough variation from the standard to warrant it. As far as species quoted here and not described (because not belonging to or not known from the South American Flora) are concerned, the reader is referred to my previous paper (1956).

In South America we have observed a total of 66 species, a rather large number if this is compared with 34 species (according to Kühner & Romagnesi) in Europe and 57 (according to Murrill in "North American Flora") in North America (including the North American tropics).

Nevertheless, the North American species are not yet fully studied, and particularly in the section *Pluteus* many novelties will be discovered.

For the citation of herbaria the abbreviations recommended by Lanjouw (Chron. Bot. 5: 143-150. 1939) are used. Color names are printed in quotation marks if they are taken from R. (i.e., Ridgway, Color Standards and Color Nomenclature, Washington D.C. 1912) and in *italics* if taken from M & P (Maerz, A. & M. Rea Paul, Dictionary of Color, New York, 1930, 1st ed., unless otherwise indicated).

KEY TO SECTIONS AND SUBSECTIONS

- A. Epicutis of pileus exclusively of elongated elements, either forming a cutis or a palisade of cystidioid terminal members of hyphal chains; clamp connections present or absent.
 - B. Cystidia of the metuloid type present, usually with apiculi or prongs or horns or other kinds of appendages, rarely without them and then often acute, wall always more or less thickened at least near or at apex
Sect. *Pluteus*, p. 200
 - B. Cystidia present, but not metuloid, i.e. not thick-walled, not appendiculate or horned except for some rather irregular excrescences in some species. Sect. *Hispiderma*, p. 214
- A. Epicutis of pileus not or not exclusively formed by elongated elements; clamp connections absent. Sect. *Celluloderma*, p. 257
 - C. Epicutis with dermatocystidia (or dermatocystidioid epicuticular elongated elements). Subsect. *Mixtini*, p. 257
 - C. Epicutis without dermatocystidioid elements; elements of epicutis practically all vesiculose, not or indistinctly dimorphic. Subsect. *Eucellodermini*, p. 274

SECTION PLUTEUS

Sect. *Trichoderma* Fayod, Ann. Sc. Nat., Bot. 9: 364. 1889.

(Sect.) *Tricholomatae* Lange, Dansk Bot. Ark. 2(7): 4. 1917.

Sect. *Fibrillosi* Imai, J. Fac. Agr. Hokk. Imp. Univ. Sapporo 43(1): 158. 1938.

?Sect. *Sessilispora* Fayod, l.c.

Epicutis of the pileus with elongated, pilose or hyphous elements which are mostly applicate or suberect in fascicles especially in the center of the pileus, gelatinized, or, more often not gelatinized; spherocysts none. Hyphae either with or without clamp connections; metuloids numerous, with partly or entirely thickened wall and deep rooting pedicel, with an apex characterized (at least in the majority of the metuloids) by the presence of prongs, hooks, spinules, and other excrescences, sometimes with acute tooth-like projections even on the sides rarely without projections of any kind and then reminding one of the metaloids of *Inocybe*.

Type species *Pluteus cervinus* (Schaeff. ex Secr.) Kummer.

Note: The section *Sessilispora* Fayod is hardly different from sect. *Pluteus*. The absence of sterigmata must be an error in observation. Both species which are cited for this group by Fayod are undoubtedly good species of this section. It is improbable that Fayod had other, until now unknown species in mind which he misdetermined. Although Fayod thought to have observed sessile spores in several other species of Agaricales, it is almost certain that—at least in Europe—all basidiospores of agarics arise from sterigmata.

KEY TO THE SPECIES

- A. Clamp connections present.
 - B. Cystidia only with apical prongs.
 - C. All cheilocystidia hyaline: subtropical species.....
 Stirps *Subcervinus*: 1. *P. fibulatus*
 - C. Some cheilocystidia with brownish sap; species of the southern temperate to frigid zone...Stirps *Atromarginatus*: 2. *P. spegazzinii*
 - B. Cystidia with lateral prongs.....Stirps *Spinulosus*: 3. *P. spinulosus*
 - A. Hyphae without clamp connections.
 - D. Metuloids with some kind of excrescencies, apiculi, prongs, etc.; pileus grey, umber, brown, deep fuscous, or colorless (white).
 - E. Entire carpophore without pigment.....
 Stirps *Viscidulus*: 4. *P. viscidulus*
 - E. At least the center of the pileus somehow brownish.
 - F. Edge of lamellae not discolored, without colored cheilocystidia.
 - G. Metuloids characteristically short and obtusely pronged or prongs horizontal to recurved, but not attenuated from a broad base to a simple or crested acute apex.....Stirps *Harrisii*
 - H. Pileus rather deep colored; spores 6-9.8 x 5-6.5 μ5. *P. harrisii*
 - H. Pileus less deep colored; spores 5-6 x 2.7-3.7 μ6. *P. angustisporus*
 - G. Metuloids not as described above, or few so....
 Stirps *Xylophilus*
 - I. Metuloids dimorphic, cheilocystidia not all elongated.....7. *P. xylophilus*
 - I. Not so.
 - J. Spores relatively small (4.8-6.2 x 3.5-4.8 μ); metuloids with rather thin wall; circular remainders of volva grey at base of stipe.....
 8. *P. stephanobasis*
 - J. Spores usually somewhat larger; metuloids not all thin-walled; no traces of volva. (see *P. xylophilus*)
 - F. Edge of lamellae with colored cheilocystidia.....
 Stirps *Aporpus*: 9. *P. aporpus*
 - D. Metuloids without prongs, quite similar to those of *Inocybe*.
 Pileus yellow with melleous center.....
 Stirps *Amphicystis*: 10. *P. amphicystis*

STIRPS SUBCERVINUS

1. *PLUTEUS FIBULATUS* Sing. in Sing. & Digilio, Prodr., Lilloa **25**: 252. 1951 (1952). Fig. 1.

Pileus dark brown (*cattail* 8-H-12 M&P), strongly radially fibrillose, with floccose-tomentose center, convex, in mature caps depressed around the umbo, the depression surrounded with a concentric wall, the umbo very broad and very obtuse, 57-80 mm. broad. Lamellae pink, with paler edge, close or crowded, 5.5-7 mm. broad, free, in age remote-free. Stipe strongly umber-fibrillose from the apex down to the base, between the fibrillose elements white, solid, often compressed, equal, 60-67 x 4.5-9 mm. Context white, unchanging, odor none. Spores 7.2-8 x 6.6 μ , smooth, stramineous. Hymenium: Basidia 24.5-35 x 8-10.3 μ , 4-spored; metuloids 71-94 x 18-23 μ , more or less ventricose or fuscoid, numerous but not crowded, with medium thick or thick walls (wall 0.7-1.5 μ thick), with (1)-2-5 (mostly 3) apical horns;

cheilocystidia not horned, cylindric or subclavate, always rounded above, hyaline, making the edge heteromorphous and paler, $54-87 \times 18-22 \mu$. Hyphae all with clamp connections, subhymenium cellular; hymenophoral trama inverse, of clavate hyphae ($8-10 \mu$ thick), hyaline. Cuticular layer of pileus: epicutis consisting of elongated elements which are at first somewhat erect but soon depressed, so that they seem to constitute a cutis, single terminal elements cylindrical-fusoid or subventricose, with rounded apex, rather elongate but often with secondary septa, pigment intracellular, dissolved, brown.

On rotten wood, submerged in the soil of a garden, summer-fruiting.

ARGENTINA; Province Tucumán, Capital, Singer T 141 (LIL, MICH). BRAZIL, São Leopoldo, Rick (under a herbarium name), (ANCH 14527).

This species is easily recognizable because of the fibrillose deep colored surfaces and the presence of clamp connections, but does not seem to be frequent. It is not characteristic of the montane subtropical forest but rather of slightly drier habitats in the plains.

STIRPS ATROMARGINATUS

2. *PLUTEUS SPEGAZZINIANUS* Sing. Sydowia 6: 221. 1952.

Pileus "clove" with darker center, somewhat squamose or fibrillose in a majority of caps, the margin glabrous and merely more or less radiately innately fibrillose, in wet weather often slightly sublubricous or opimous, convex, becoming applanate, then depressed, often slightly umbilicate or umbonate when mature, $45-80$ (110) mm. broad. Lamellae pink with a brownish edge which is not noticeable unless several specimens are investigated with the aid of a hand lens, close, free. Stipe white with innate fuliginous or brown fibrils, especially below, often white except for the fibrillose base, other times the fibrillosity almost reaching the apex, solid, tapering upward, $35-78 \times 7-14$ (20) mm. Context white, unchanging, fleshy, mild, inodorous. Spores $6.8-9 \times 5.5-6.8 \mu$, pale pinkish stramineous, smooth, non-amyloid short ellipsoid to ovoid. Basidia $27-41 \times 7.5-8.3 \mu$, clavate, 4-spored. Cheilocystidia $37-55 \times 13.7-19.3 \mu$, broadly fusoid to balloonshaped-vesiculose, some being hyaline and some filled with an intracellular pigment which is dissolved in the cell sap, brownish. Metuloids initially thin-walled and not horned and some remaining so, especially those near the edge of the lamellae (they are hyaline, elongate-fusiform, $55-110 \times 6.8-16.5 \mu$ mostly over 96μ long and over 11μ broad) but the majority becoming true metuloids, somewhat thick-walled to distinctly thick-walled, at least in the upper half, with horn-shaped prongs which are rarely short and obtuse, mostly numbering two or three and rather strongly projecting and acute as in *Pluteus cervinus*; general measurements of the metuloids (50) $-83-110 \times 11-22 \mu$. Hymenial trama inverse, hyaline. Epicutis of the pileus consisting of repent hyphae, those with brown cell sap usually very long and thin, e.g. $130-200 \times 12-20 \mu$. All hyphae with clamp connections, or at least some hyphae with clamp connections.

On trunks of various species of *Nothofagus* in the woods, fruiting from February until May, growing solitary or in small groups, rather frequent.

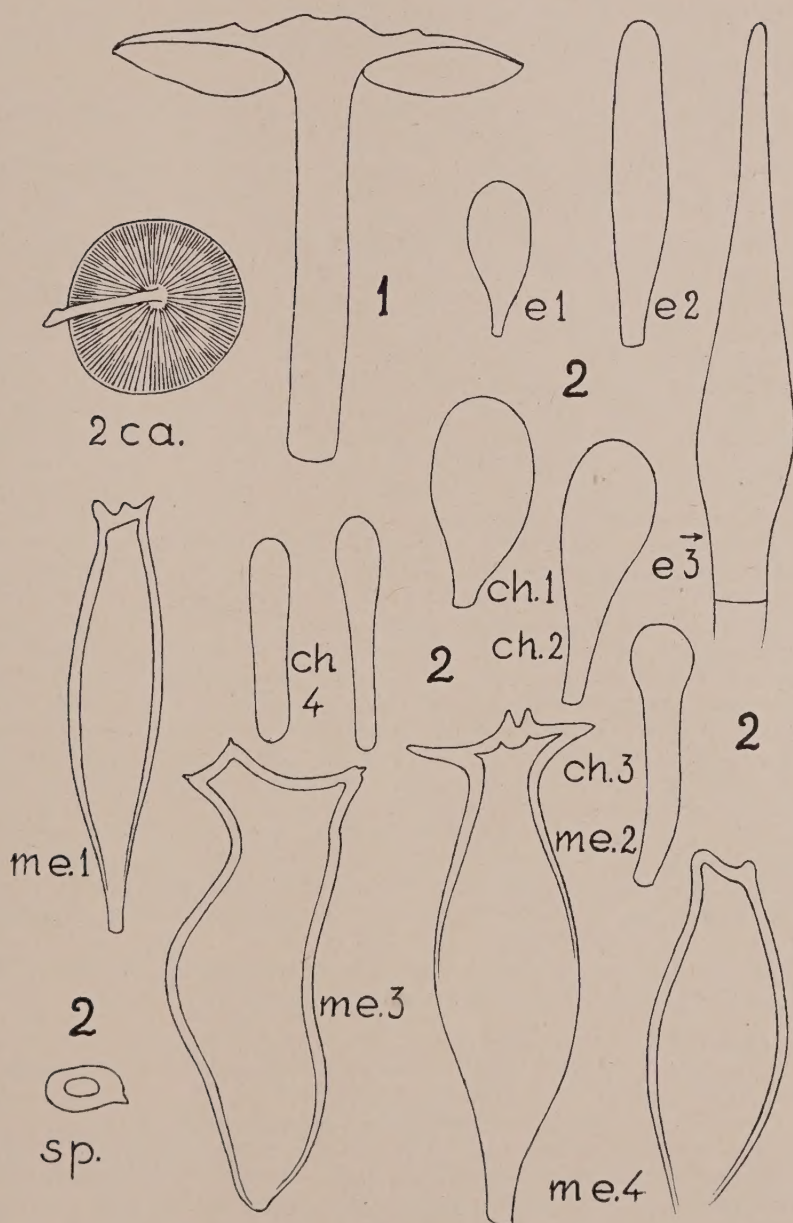


PLATE 1. FIG. 1. *Pluteus fibulatus*, section through carpophore, x 0.9. FIG 2. *P. angustisporus*, ca=carpophore, x 0.9; e=three types of epicuticular elements, x 900; ch=four types of cheilocystidia, x 900; me=four types of metuloids x 900; sp=spore x 1.800.

ARGENTINA: Tierra del Fuego, Est. Nueva Argentina (R. G.), Singer M 153, M 303, M 303a, 10-18-II-1950 (LIL, MICH). Neuquén, Quetrihué, Singer M 675a (LIL).

3. *PLUTEUS SPINULOSUS* Murr., North Amer. Fl. **10**(2): 138. 1917. Contrib. Un. Mich. Herb. 1, pl. 2, fig. 6-8, 1939.

This species was included in the key because it might occur in South America (See Singer, Trans. Brit. Myc. Soc. **39**: 186. 1956.)

4. *PLUTEUS VISCIDULUS* Sing. in Singer & Digilio, Lilloa **25**: 255. 1951 (1952);—Trans. Brit. Myc. Soc. **39**(2), fig. 40. 1956.

Pileus snow white, slightly but distinctly viscid in moist weather, glabrous, naked, smooth, convex, then applanate, slightly subumbonate, or umbonate, eventually often depressed in the center, 27-60 mm. broad. Lamellae pink, broad, subventricose or ventricose, close, free. Stipe white, eventually at base at times slightly fulvidulous-pallid, glabrous or eventually somewhat fibrillose-silky at base, sub-smooth, solid, tapering towards the apex, 40-75 x 5-11 mm.; basal mycelium white; veil none. Context white, unchanging, somewhat elastic, not very fragile, odor none. Spores 6.3-9 x 4.2-7.5 μ , cylindric-subisodiametric, or short ellipsoid, flesh straw-color, smooth. Hymenium: Basidia 4-spored. 21-24-(36) x 7.5-9.2 μ . Metuloids on edge and sides of lamellae, 48-90 x 9.5-25 μ , on sides not but on apex strongly (2)-4-6-(7)-pronged, prongs spine-shaped, 5-9.3 μ long and acute, pedicel deep-rooting, walls in upper third moderately thickened (up to 1.8 μ), hyaline, numerous. Cheilocystidia 42-58 x 15.5-21.5 μ , hyaline, making the edge heteromorphous, vesiculose and usually very broadly rounded, very rarely more elongate and sometimes forming transitions toward the metuloids by being more elongate and showing only one (exceptionally two) less conspicuous horns. Hyphae: all without clamp connections and without pigment, tramal structure inverse. Covering layer of pileus: Epicutis consisting of dense strands of filamentous (2.5-8.2 μ diam.) hyphae which are subparallel with each other, colorless, somewhat loosely arranged and repent in a gelatinous mass, or at least portions of epicutis consisting of single hyphal chains so imbedded.

On rotting stumps and rotten logs of dicotyledonous trees (e.gr. *Eugenia*, *Quercus*) in the forest, fruiting in summer and winter.

ARGENTINA: Prov. Tucumán, near Tapia, Singer T 797, (LIL, MICH) type. BRAZIL: Est. Rio Grande do Sul, São Salvador, Singer B 111 (LIL). FLORIDA, Gainesville, F 1713 (F).

There is a question whether the Florida specimen belongs to this species. In the Florida specimen the spores are broader and the metuloids shorter, the cheilocystidia more variable. Furthermore, the Florida form is winter-fruiting whereas the type form is summer-fruiting.

The Florida form may be identical with a specimen from Bulgaria preserved at K and labeled *P. pellitus*, but without clamp connections. If specimens of the Northern Hemisphere have constantly different spores and metuloids and tend to fruit more abundantly at lower temperatures, it may be wise to separate them from *P. viscidulus*.

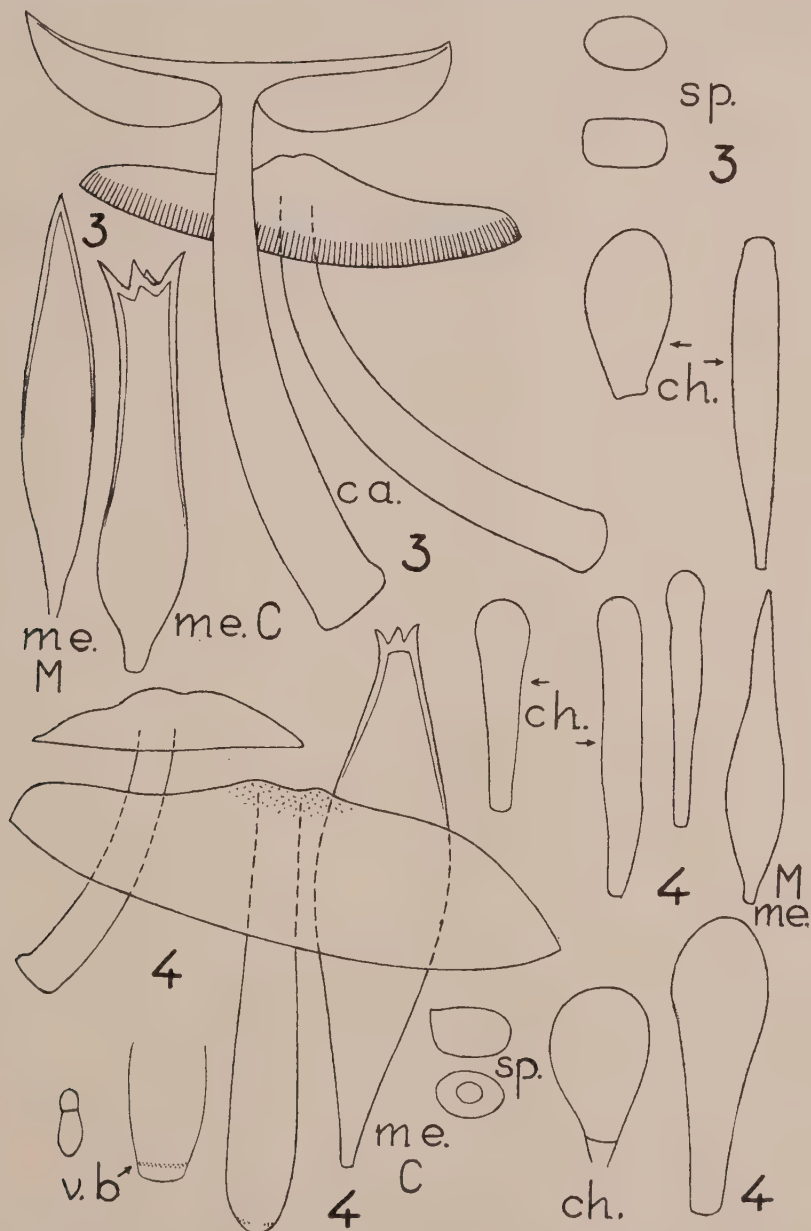


PLATE 2. FIG. 3. *P. xylophilus*, me=M metuloid of the Magnus-type, x 900; me C=metuloid of the Cervinus-type, x 900; ca=carpophores, x 0.9; sp=spores, x 1.800; ch=cheilocystidia, x 900. FIG. 4. *P. stephanobasis*, figs. at left lower corner=carpophores, x 0.9 (v.b.=volval belt, left of it a primordium); me C=metuloid of the Cervinus-type, x 900; sp=spores, x 1.800; ch=cheilocystidia x 900; me M=metuloid of the Magnus-type, x 900.

5. *PLUTEUS HARRISII* Murr., *Mycologia* **3**: 276. 1911;—Trans. Brit. Myc. Soc. **39**, fig. 20, 1956.

Pluteus cervinus var. *bambusinus* Baker & Dales, *Comm. Mycol. Inst., Mycol. Pap.* **33**: 93. 1951.

Pileus "Hair Brown" with "Chaetura Drab" or "Dark Vinaceous Drab" (R.) center, relatively dark colored in most specimens, with smooth, then striate-sulcate margin, often very indistinctly subrugulose, convex, often subumbonate or subumbilicate, eventually applanate or slightly depressed, 20–45 mm. broad. Lamellae pink, subclose to close, subventricose, free, rather broad (up to 7 mm.). Stipe white, sometimes with pale greyish base, glabrous, naked, equal, shining, solid, 25–50 x 2–5 mm. Context white, thin, unchanging, inodorous. Spores 6–9.8 x 5–6.5 μ . Hymenium: Basidia 19–24 x 7–7.7 μ , 4-spored. Metuloids rather numerous on both sides and edges, more numerous on sides of lamellae, hyaline, ventricose with concave upper outline, with thick wall (in upper half 1.5–2.8 μ), gradually more thin-walled below (thin-walled and easily collapsing in lower quarter), comparatively short and broad, ventricose with pedicel and a short neck, with broad, obtuse and low prongs, some metuloids with longer and then secondarily crested almost horizontal or recurved prongs, some with rather short erect prongs which are then relatively few (mostly 2), broad and broadly rounded at apex, but usually with (1)–3–4 (5) short (up to 4, but mostly up to 2 μ long) prongs, 43–78 x 14.3–26 μ . Cheilocystidia clavate-elongate, thin-walled, making the edge heteromorphous, intermixed with a few short-vesiculose-clavate ones, e.g. 33 x 18 μ , hyaline, 33–42.4 x 7.8–18 μ . Hyphae without clamp connections. Covering layers: Epicutis of pileus consisting of applicate elongate hyphae, the terminal members subulate or ampullaceous or cylindrical, with gradually thinning but obtuse, or broadly rounded apex, the tips or the entire terminal cell usually hyaline, and 4.3–12 μ broad below with fuscous, sometimes locally condensed intracellular pigment, especially in the lower cells of the chains, and there sometimes thicker (12.8 μ), in average about 100 μ long.

On burned woody matter of angiosperms and on decaying wood, Florida to Jamaica and Trinidad, fruiting almost the year round according to climatic conditions.

U.S.A.: Florida, Highlands Hammock State Park, Highlands Co., 27 August, Singer F 413 (F). JAMAICA: Cockpit Co., Troy & Tyre, Murrill 956, type (NY). TRINIDAD: St. Joseph, bamboo plantation, 9 August 1947, R.E.D. Baker 1495 (K, type of *P. cervinus* var. *bambusinus* B. & D.).

6. *Pluteus angustisporus* Sing., spec. nov.—Fig. 2.

Characteribus suis cum *Pluteo harrisii* nonnihil concordat sed sporis angustioribus (5.5–6 x 2.7–3.7 μ) et cystidiis magis variabilibus differt. Ad lignum dicotyledoneum, Bolivia, Pando (Madre de Dios), Las Piedras, Singer B 2497 (LIL).

Pileus in color exactly as in *Pluteus cervinus* or *xylophilus*, finely densely appressedly radially fibrillose, convex then flat convex with a slight small umbo, 21–25 mm. Lamellae pink with pink edges, s.l.

pilose from projecting cystidia, close, broad, free. Stipe entirely pallid, glabrous, equal, solid, 21 x 2 mm. Context white, unchanging, odor none. Spores 5.5-6-(7) x 2.7-3.7-(4.2) μ , ellipsoid to cylindrical, small and narrow like in *Pluteus unakensis*, narrower than in *P. cervinus*, *xylophilus*, or *harrisii*, smooth, stramineous. Hymenium: Basidia ventricose, 4-spored. Metuloids uniformly of the *Cervinus* type but many or most similar to those characteristic of *Pluteus harrisii*, i.e. with short, inconspicuous excrescencies at the apex, of five different types (1) long (64-81 x 14-15 μ) with thick (2-2.7 μ) walls; (2) broader 48-88 x 16-22 μ and walls thickened only in upper portion, more rarely all over, prongs relatively long and acute but usually horizontal; (3) with irregular outline, branching or with side-prongs, the prongs obtuse or with secondary apiculus, 55-74 x 20.5-21.5 μ , (4) as above

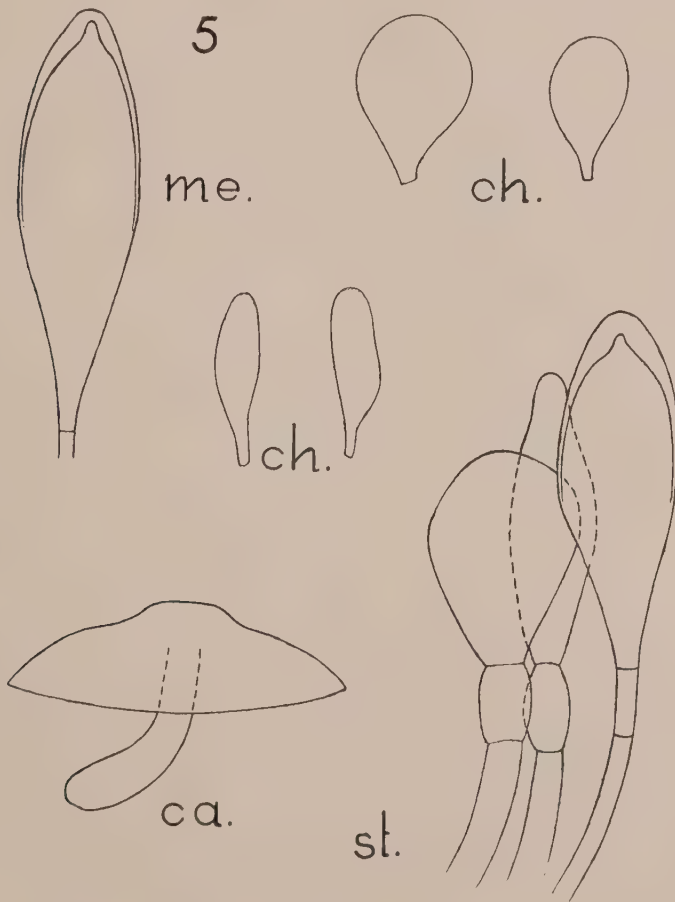


PLATE 3. FIG. 5. *P. ampicystis*, me=metuloid, x 900; ch=cheilocystidia, x 900; ca=carpophore, x 0.9; st=surface elements of the stipe, x 900.

(3), but simple, prongs only apical and always quite obtuse, e. gr. $52 \times 20.7 \mu$; (5) simple with just one acute tip (extremely scarce and found only once). Cheilocystidia likewise very polymorphic, always relatively short and broadly rounded above but (1) short-clavate to vesiculose-subglobose or obpiriform, $19-35 \times 13.5-17 \mu$ (2) claviform, $16.5-44 \times 7.5-14.5 \mu$; (3) cylindrical with globose capitulum at apex, $23-41 \times 4.8-8.3 \mu$, capitulum $8.8-10.3 \mu$ in diam. (4) long-clavate or cylindrical although broadly rounded above and entire (few), $30-35 \times 5.5-6.3 \mu$; ventricose below or in middle, sometimes subcapitate, 1(-several)-pronged (prongs short and inconspicuous), $34-36 \times 8.2-15 \mu$ (few: transition between cheilocystidium and metuloid). Hyphae: All without clamp connections. Hymenophoral trama hyaline, inverse. Covering layers: Epicutis of pileus consisting of many brown (pigment intracellular, uniformly dissolved) and few hyaline elements, terminal members of cutis always elongated and repent, of three types (1) clavate and well pigmented, e. gr. $25 \times 8.2 \mu$; (2) longer, cylindrical, pigmented or not, e. gr. $48 \times 8.2 \mu$; (3) even longer, tapering from thickest portion (at last septum) to apex e. gr. $86 \times 13.8 \mu$, all types with broadly rounded apex.

On wood of dicotyledonous plants in tropical rain forest.

BOLIVIA: Oriente (Dpto. Pando); prov. Madre de Dios, Las Piedras R. Singer B 2497, 5-IV-1956 (LIL), type.

This species has a rather banal appearance, and very variable cystidial characters but can be distinguished by its remarkably narrow spores.

7. *PLUTEUS XYLOPHILUS* (Speg.) Sing., Lilloa **23**: 203. 1950 (1951).
Fig. 3.

Entoloma xylophilum Speg., Bol. Ac. Nac. Cord. **28**: 305. 1926.

Pluteus cervinus var. *brasiliensis* Bres., Ann. Mycol. **18**: 30. 1920.

Pluteus cervinus var. *tucumanensis* Sing. in Sing. & Digilio, Lilloa **25**: 254. 1951 (1952).

Var. *XYLOPHILUS*.

Pileus *polo tan* (13-C-6 M&P) to *thrush* (14-C-7 M&P) or *burnt* (M&P 12-K-6), center deeper colored, e. gr. *clove* M&P (15-C-12), *winterleaf* (15-A-8) M&P, sometimes *marron glacé* (M&P 14-A-8) or *aztec* (13-I-8 M&P), in an intermediate zone or at times all over the pileus more watery and pallid near *sombrero* (M&P 11-D-4) or *yellow beige* (M&P 13-H-7), or with pale dirty gray center and pallid margin, glabrous except for the center which shows deeper brown warts and squamules, outside center only slightly fibrillose to inconspicuously appressedly squamose, but ordinarily seen glabrous and naked since the fibrils forming the ornamentation disappear soon because of the subopimus surface which tends to become levigate in rains, with smooth or more rarely up to 11 mm. sulcate or transparently striate margin, convex, often umbonate, the umbo at times with umbilicus, eventually applanate, rarely depressed, 22-85 mm. broad. Lamellae sordid white or white, soon pink with pink edges, close to crowded, rather broad to broad, free. Stipe white, in lower three quarters to one quarter either equally white and glabrous or else with innate or at least appressed longitudinal fibrils which are sordid

to gray or umber brown, or generally becoming slightly fuscidulous below in age, smooth or slightly longitudinally coarsely-sulcate, with or without a truncate or bulbous base, tapering upward, more rarely equal or tapering downward, solid, 34–85 x 4–14 mm., sometimes compressed; mycelium at base white, veil none. Context white, unchanging, inodorous, or sometimes with a strong mouldy or fungous odor. Spores 5.5–7 x 3.6–4.7 (5.8) μ , ellipsoid, cylindrical, or ovoid, smooth, stramineous. Hymenium: Basidia 22–30 x 6.8–9 μ , ventricose or clavate 4-spored. Metuloids 40–75 x 7–22 μ , of three types (1) the normal cervinus type, (2) the modified cervinus type as found in *P. harrisii* and *P. angustisporus* (not always present), and (3) the Magnus type (particularly near the edges of the lamellae, and sometimes abundant, sometimes scarce, never absent; wall thick to very thick in the Cervinus-type metuloids (at least in fully mature specimens), reaching 2.7 μ diam., moderately thick-walled to (rarely) thin-walled in the Magnus-type, prongs mostly all apical, or in some cases a few of them lateral, more often acute than obtuse, erect, oblique or horizontal, one to four, at times with a secondary apiculus over one or several prongs, or (in type 2) often consisting of nothing more than an apiculus of 1 μ height. Cheilocystidia dimorphic, (1) long-cylindrical-clavate, 50–73 x 7–12 μ (2) short-vesiculose, 14.5–25 x 12–13 μ (with occasional transitions between the two extreme forms, of which form (1) or form (2) may be the more common one, according to individual differences, in these transitional cells there is often a clavate to globose thickening in the apical portion and a long pedicel below. Hyphae: All without clamp connections. Hymenophoral trama hyaline, inverse. Covering layer of pileus: Epicutis of filamentous hyphae with rounded ends, generally repent but in young specimens in erect bunches forming the fibrils of the center of the pileus, some without pigment, others with intracellular mostly evenly dissolved fuscous pigment.

On manufactured wood and on fallen trunks and stumps of dicotyledonous trees such as *Schinopsis*, *Jacaranda*, *Salix*, fruiting during the rainy season in temperate Chaco, subtropical (southern fringe) and tropical (rain forest) vegetation, in the lower montane (fog forest) and montane xerophytic (in "oasis" type of vegetation) zone as well as in the plains, widely distributed from Central Argentina to the Amazonas and apparently Ecuador (northern limit unknown).

ARGENTINA: Prov. Buenos Aires, La Plata, Parque, on *Brussonetia papyrifera*, C. Spegazzini (LPS, typus). Prov. Tucumán, Santa Rosa, Singer T 1063—Anta Muerta T 469—Capital T 3030 T 3103 (all: LIL). Prov. Salta: Orán T 2305—Cafayate, K. Hayward, T 2609—Cafayate toward San Luis, T 2734 (all: LIL). BRAZIL: Rio Grande do Sul, Rick (FH)—Steffen (LIL). BOLIVIA: Oriente (Dpto. Beni), Riberalta, 170 m. alt. Singer B 2335 (LIL). PERU: Tingo Maria, J. B. Carpenter 132, (LIL).

Var. **tucumanensis** (Sing.) Sing., comb. nov.

Pluteus cervinus var. *tucumanensis* Sing. in Sing. & Dig. l.c.

This is a smaller elongate form in which the vesiculose-clavate cheilocystidia predominate.

On wood of Compositae and other families in montane and sub-

tropical forest of the province of Tucumán, Río de los Sosas, Singer & Digilio T 10 (LIL), Tañi del Valle, Singer T 772 (LIL, type).

Var. **major** Sing., var. nov.

Carpophoris paulum majoribus (pileo \approx 10 cm. lato), pileo plerumque subalbo et cheilocystidiis plerumque elongatis differt.

This variety differs in slightly larger carpophores, and in having the vast majority of the cheilocystidia of the elongated type; pileus usually little pigmented, mostly white except on disc.

Odor slight and agreeable.

On dead dicotyledonous trunk in the upper zone of the subtropical forest, summer-fruiting.

ARGENTINA: Prov. Tucumán at 1100 m. alt., Anta Muerta. Singer T 1042 (LIL), type. Capital, Singer T 3030, T 3105 (LIL).

While this variety is larger and has predominantly elongated cheilocystidia, the preceding one marks the other extreme, being smaller and having predominantly vesiculose-clavate cheilocystidia. This means that the former (var. *major*) is intermediate between *P. xylophilus* and *P. magnus*, differing from the latter almost exclusively by cystidial characters (and hosts—but this might be coincidental), i.e., by the existence of broad and short cheilocystidia (even though in smaller number than ordinarily), and a greater variability of the metuloid in accordance with the specific characters of *P. xylophilus*. It would be possible to defend the thesis that *P. xylophilus* var. *major* is even closer to *P. magnus* than to *P. xylophilus*, but the mere fact of its occurrence within the area of typical *P. xylophilus*, even at a few feet distance from trunks with mycelium of typical *P. xylophilus*, seems to indicate that it originated from the latter, or the latter from var. *major*, rather than var. *major* from *P. magnus*. Not all whitish forms of *P. xylophilus* have been checked for the relative frequency of occurrence of the two types of cheilocystidia, and it is possible that some of the specimens cited for the type variety (for example those from Prov. Salta) belong here. It is also possible that the relative number of cheilocystidia types on the edges of a population is not fixedly correlated with the abundance of pigment on the pileus and size of the carpophores. If so, it would become necessary to check whether each of these characters remains constant in successive fruitings. If not this variety would be, strictly speaking, a forma. If, however, the two characters are constantly correlated, this might constitute an independent microspecies such as is often observed in this section, particularly in North America. For the time being, we prefer the neutral term *varietas*.

On the other hand, *P. xylophilus* var. *tucumanensis* seems to be intermediate between *P. xylophilus* var. *xylophilus* and *P. curtisii* (= *P. patricius*), common in the northern hemisphere. Our South American form with predominant short cheilocystidia, however, differs from *P. curtisii* macroscopically: in being small and thin, and showing many umber colored fibrils. Here, as in the case of var. *major*, it is still impossible to tell whether we have a forma or a microspecies, and only a special study of the complex *P. curtisii-xylophilus-magnus* will decide the question.

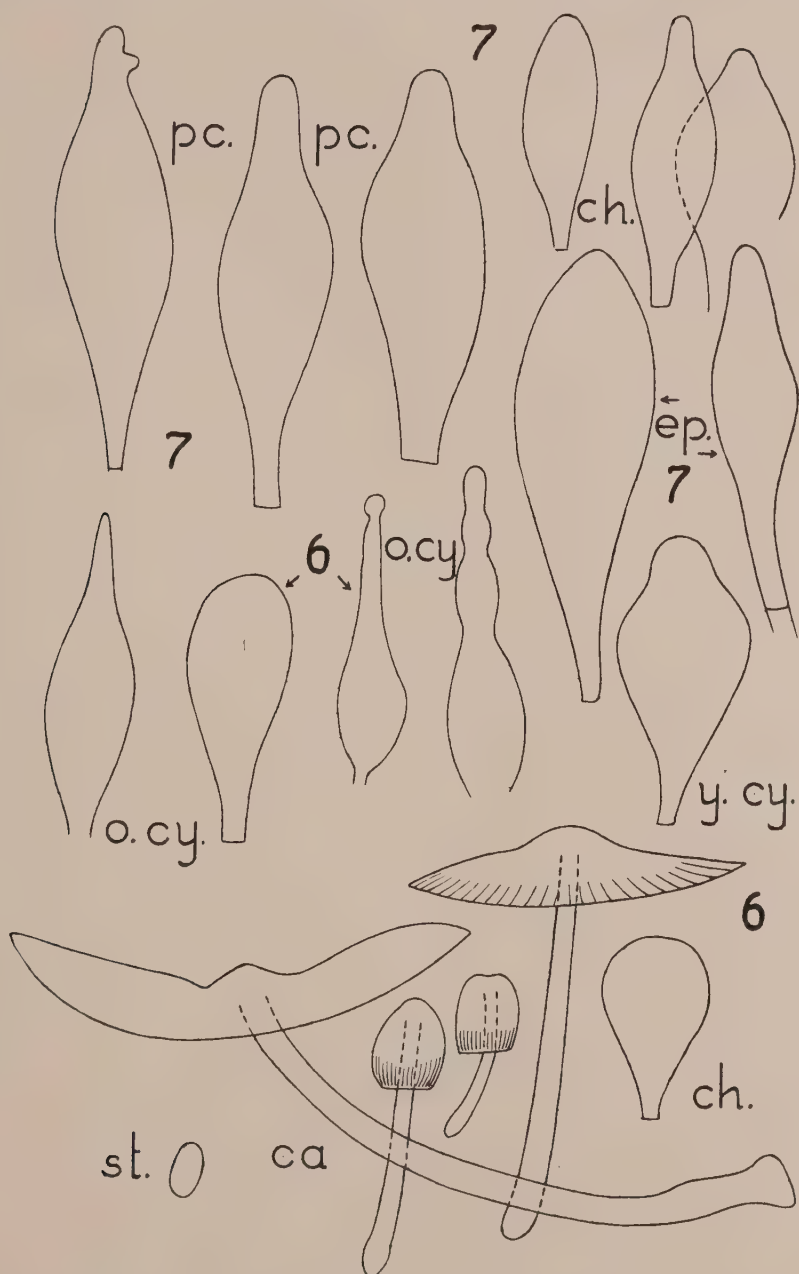


PLATE 4. FIG. 6. *P. compressipes*, o.cy=cystidia of an old fruiting body, x 900; y. cy=cystidia of a young fruiting body, x 900; st=transversal section of the stipe, x 0.9; ca=carpophores, x 0.9; ch=cheilocystidium, x 900. FIG. 7. *P. fernandezianus*, pc=pleurocystidia, x 900; ch=cheilocystidia, x 900; ep=elements of epicutis of pileus, x 900.

8. *Pluteus stephanobasis* Sing., spec. nov.,—Fig. 4.

Stipite ad basin volvae fragmentariae fibrillis cingulato. Sporis parvis, $4.8-6.2 \times 3.3-4.2-(4.8) \mu$, macrosporis paucis ($7.5-9 \times 5.5-6 \mu$) vel nullis. Ceterum *P. xylophilo* simillimo.

Pileus fuscous on umbo and radial stripes which are flamelike (not fibrillose) on almost pallid ground, the fuscous: between *winter leaf* to *English oak* (M&P 7-A/C-10) and *New cocoa* to *kermanshah*, (M&P 15-A-8/10), sometimes with *Rembrandt* (8-H-9) shades or eventually with *clove* (15-C-12) discoloration, at first opaque and quite dry, sometimes with some appressed sordid gray fibrils on center, eventually often becoming somewhat opimous or innately silky, often somewhat rugose in center, often with appressedly squamulose on disc from general veil, otherwise smooth, with estriate, somewhat projecting margin, convex and often umbonate, later convex-applanate with subumbonate and in the very center umbilicate disc, 42-106 mm. broad. Lamellae white, soon light pink, with whitish edge, broad (e. gr. 11 mm.), close, almost crowded in some individuals, free. Spore print the ordinary sordid pink of the *Pluteae*. Stipe white, below mostly with grayish fuscous appressed fibrils which correspond to coarse longitudinal ribs in that region and terminating in the volval ring-line, also with some (variable) pallid fibrillosity in basal region, white silky at apex, solid, usually slightly tapering from base up, more rarely subequal and then either with a slight bulb at base, or not, $46-75 \times 7-21$ mm.: volva fragmentary consisting of an inconspicuous but constant and persistent deep brown to deep fuscous fibrillose line which continuously or intermittently runs around the base of the stipe; basal mycelium pure white. Context white, unchanging; odor slightly fragrant, "mushroomy" in age, banal. Taste mild. Spores all remarkably small ($4.8-6.2 \times 3.3-4.2-(4.8) \mu$) and varying between short ellipsoid to short cylindric, or else a small number of macrobasidiospores present ($7.5-9 \times 5.5-6 \mu$), all stramineous or pinkish stramineous or stramineous-hyaline, smooth, inamyloid. Hymenium: Basidia $20-26 \times 5.7-8.5 \mu$, clavate or ventricose-subampullaceous, hyaline, 4-spored, those producing the normal small spores mostly $20-22 \times 5.7-8.5$ and subampullaceous. Metuloids of two types, those near the edge of the Magnus-type, or even merely ampullaceous ventricose with thin but obtuse and entire apex, $29-51 \times 9-15 \mu$, hyaline, with up to four acute apical (rarely one or two lateral apiculi, with rather thin wall; those of the sides of the lamellae of the Cervinus type, with relatively thin wall which are however more often than not thickened in the apical region where it reaches $0.8-1.8 \mu$ in diameter, broadest in the middle or lower portion, with short subacute apical horns, rarely with a lateral horn, the horns $2-3.7 \mu$ long, the walls hyaline, the apex 1-4 horned (mostly 3 horns) and sometimes with a resinous incrusting substance, numerous but less so than the Magnus-type metuloids near edge, measuring $45-83 \times 11-21 \mu$. Cheilocystidia of two types, (1) clavate to almost balloon shaped, hyaline, $13-48 \times 8-20 \mu$, (2) cylindric to cylindric-clavate, hyaline, broadly rounded at tip, $30-50 \times 5-7 \mu$; few intermediates, the two types about equally numerous, or the vesiculose type seemingly dominant because of the others. Hyphae: all without clamp connections. Subhymenium

consisting of chains of subisodiametric small to relatively large elements (e. g. $15 \times 13.8 \mu$). Hymenophoral trama inverse, hyaline. Endocystidia of the metuloid type occasionally occurring buried in the subhymenium or hymenophoral trama. Covering layer of pileus: Epicutis with intracellular dissolved pigment, terminal elements of the repent or depressed chains of strictly elongated hyphae usually subequal to slightly ventricose, e.g., $80-85 \times 7-9.5 \mu$, broadly rounded at the tip, with thin wall; pigment melleous brown, often locally condensed.

On the trunk of a *Jacaranda* felled one to three years earlier, reappearing regularly in late fall and winter, gregarious.

ARGENTINA: Prov. Tucumán, Capital, Singer T 2802 21-IV-56, (LIL, holotypus). T 3102, 6-VII-1958 (LIL, paratypus). K. Hayward; comm. Singer T 3104, 23-VII-1958 (LIL, paratypus).

This species is closely related and very similar to the preceding one but differs in the fragmentary volva remnants, slightly smaller or dimorphic spores.

This is typical for many species of banal aspect in this group which differ from the related species only slightly but constantly. Interestingly enough, on another trunk of the same tree species appeared since 1956 typical *P. xylophilus* almost side by side with the type mycelium but constantly differing by the slightly larger spores and the absence of a dark line at the base of the stipe.

9. *P. APORPUS* Sing., Sydowia **8**: 122. 1954.

Pileus fuliginous, dry, subglabrous, not striate, convex, cc. 40 mm. broad. Lamellae white, then pink, with dark fuliginous edge, medium broad, free. Stipe whitish, somewhat fuliginous-brown, subequal, about 50×5 mm.; basal mycelium white; veil none. Context whitish, inodorous. Spores $5.5-6.2 \times 4.2-4.5 \mu$, intermixed with more elongate spores: $5.5-6.9 \times 2.5-4.3 \mu$, smooth, pale stramineous, with suprahilar applanation or with applanate internal face, rarely constricted in mid-portion. Hymenium: Basidia $20.5-25 \times 6.8-7.5 \mu$, some 4-spored, some 2-spored (the elongate spores apparently originating from 2-spored basidia!). Metuloids $57.5-73 \times 9.5-22 \mu$, thick-walled, especially at apex, but in mid-portion thinner walled than *P. spegazzinianus* (viz. up to 1μ thick), with short apical horns at apex entire on the sides, acute and "horns" $(1)-2-3(4) \mu$ long, rarely on occasional cells entirely absent, and in this case apex knotty-rugose and truncate, entirely hyaline. Cheilocystidia vesiculose, with dissolved brown pigment, few hyaline, entire. Hyphae without clamp connections. Covering of pileus: Epicutis as in *P. spegazzinianus*, with elements which are mostly appressed and contain brown intracellular pigment.

On old stump, singly, rare, in north portion of *Nothofagus* zone, fruiting in late fall.

ARGENTINA: Patagonia, Lago Nahuel Huapi Nat. Park, Isla Victoria, Singer M 803 (LIL), type.

This is the only known species with dark edges (colored cheilocystidia) and clampless septa, hence the name.

10. *Pluteus ampicystis* Sing., spec. nov.,—Fig. 5.

Pileo flavo, centro aquose melleo, scrobiculato, subtiliter tomentosus, haud viscido, convexo, late umbonato, 48-50 mm. lato. Lamellis

roseis. Stipite flavo, pruinoso, 32 x 5 mm. Sporis 4.8–6.2 x 4–5.5 μ . Cystidiis metuloidis cornubus aliisque excrescentiis destitutis, apice crasse tunicatis (1.5–3.5 μ), muricatis; cheilocystidiis plerumque vesiculososo-subclavatis 23–28 x 10–20 μ , hyalinis. Membris terminalibus hypharum epicutis pilei interne brunneolis, saepe metuloidis simillimis (dermato-cystidioideis), constanter apice obtusis. Hyphis omnibus defibulatis. Ad truncos in silva pluviali tropicali.

Pileus yellow, center watery melleous, scrobiculate, finely tomentose, or subfibrillose in parts, convex with broadly rounded low umbo, not viscid, 48–50 mm. broad. Lamellae pink with pallid edge, broad, close, free. Stipe yellow, pruinose, tapering upward, 32 x 5 mm., mycelium white at base, veil none. Context white, unchanging, odorless. Spores 4.8–6.2 x 4–5.5 μ , subglobose to ellipsoid, mostly about 0.7–0.8 μ longer than broad, but also e. gr. 6.3 x 4.8 μ , smooth, stramineous. Hymenium: Basidia 4-spored. Metuloids 39–63 x 16–27 μ , ventricose, without any horns or other kinds of excrescences, very much like metuloids of *Inocybe* and even muricate with apical crystals in many individual cystidia, with thin walls which become abruptly or gradually thick at the apex reaching 1.5–3.5 μ there (otherwise about 0.5 μ). Hyphae without clamp connections, hyaline in the trama. Covering layers: Epicutis of pileus consisting of elongated hyphae, the terminal members elongated with broadly rounded tips, often cystidioid and showing the shape and thickened walls at the apex (1–4.2 μ diam.) of the hymenial metuloids, filled with brownish cell sap. On the stipe the pruina consists of hyphae which consist of elongated elements terminating in a short (e. gr. 11 x 7 μ) cell (corresponding to the subhymenium) and a cystidioid terminal cell which may be clavate or ventricose (up to 20 μ broad) with rounded apex, about 35 μ long, and the tips moderately thickwalled (up to 0.7 μ); aside from that there are true dermatocystidia of the metuloid type, e. gr. 28–53 x 9–15.2 μ just like the hymenial metuloids, all these elements hyaline and rather numerous even in the lower part of the stipe.

On dead standing trunk in rain forest.

BOLIVIA: Oriente (Dpto. Pando): Manuripi; Conquista. Singer B 2249, 26–III–1956. (LIL, typus).

This is a remarkable species, quite different from the others in metuloid shape and color of the pileus.

SECT. HISPIDODERMA Fayod, Ann. Sc. Nat. VII, 9: 364.
1889³, sensu Kühner & Romagnesi.

³Fayod indicates subregular trama which corresponds to old carpophores in all sections of this genus, "cuticule hispide" which I take to mean the somewhat dissociated state of the older velutinous specimens of this section, and "cystides irreguliers en crochet" which is merely a mistake unless it refers to the nodulose outgrowths some of the cystidia of this group sometimes produce. Fayod cites only *P. leoninus* as representative ("et probablement les espèces voisines"). Since this is evidently the largest section of the whole genus in Europe as elsewhere it is impossible to assume that Fayod has entirely overlooked it and since *P. leoninus* in the sense we think corresponds best to the description of Fries belongs to precisely this section, our interpretation cannot be different, inasmuch as in case one would prefer to interpret it according to the description of the cystidia, it would be impossible to separate it from the section *Pluteus* (*Trichoderma* Fayod), and, moreover, the European (section) *Pluteus* flora does not contain a species of the color described by Fries and others for *P. leoninus*.

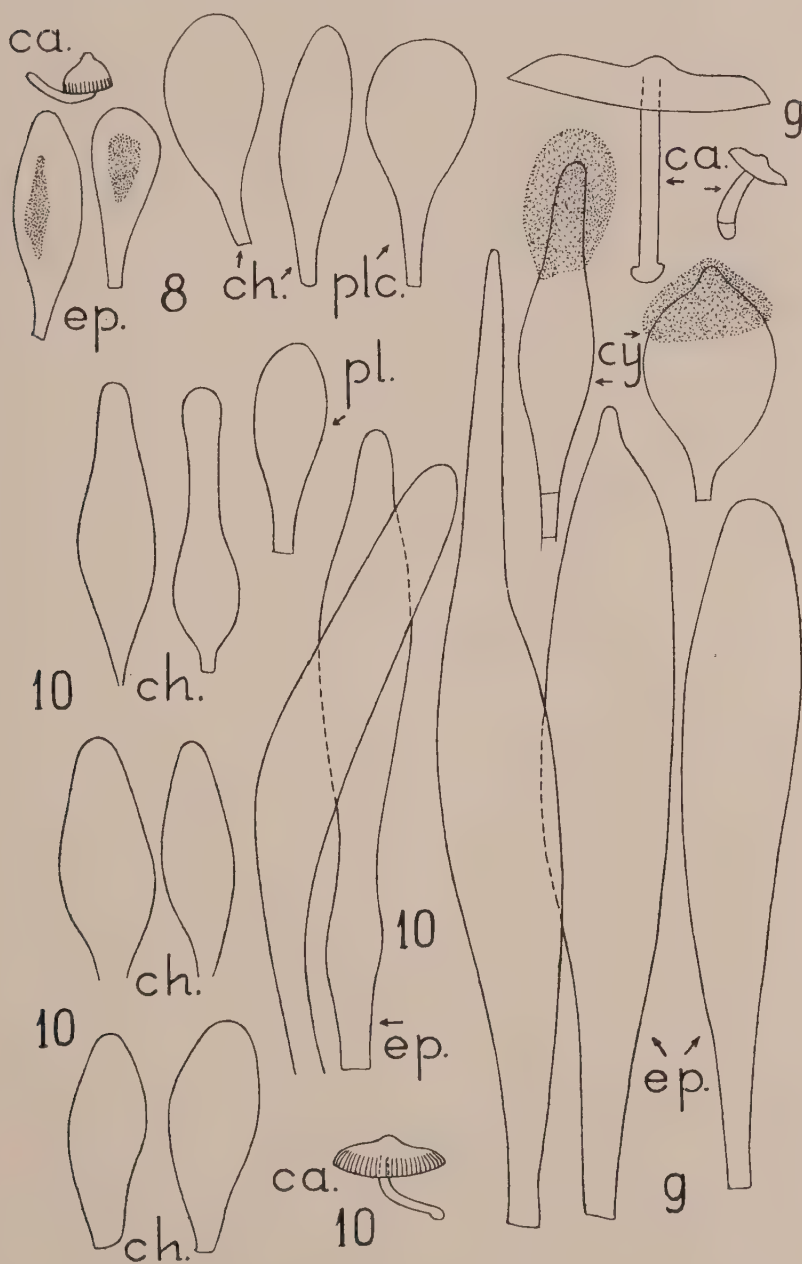


PLATE 5. FIG. 8. *P. eupigmentatus*, ca=carpophore, x 0.9; ep=elements of epicutis of pileus, x 900; ch=cheilocystidia, x 900; plc=pleurocystidium, x 900. FIG. 9. *P. circumscissus*, ca=carpophore, x 0.9; cy=cystidia, x 900; ep=elements of epicutis of pileus, x 900. FIG. 10. *P. rubrotomentosus*, ca=carpophore, x 0.9; ch=cheilocystidia, x 900; ep=element of the epicutis of the pileus, x 900.

Sect. *Trichodermei* Lange, Subsect. *Depauperati* Lange, Dansk Bot. Ark. 2(7): 4. 1917.

Sect. *Trichoderma* subsection *Hispidodermini* (Lange) Sing. Trans. Bot. Mycol. Soc. 39(2): 222. 1956.

Type species: *P. leoninus* ss. Fayod, i.e. sensu Kühner in Kühner & Romagnesi, Singer (1956) et al., non Romagnesi.

KEY TO THE STIRPES

- A. Spores 3.5–4.2 μ broad, ellipsoid.....Stirps *Unakensis*, p. 252
- A. Spores more than 4 μ broad, ellipsoid, short-ellipsoid, subglobose or globose.
 - B. Clamp connections present.....(Stirps *Nigro-lineatus*, not yet known from South America*)
 - B. Clamp connections absent.
 - C. Cystidia or cheilocystidia, or both, filled with a grey, fuscous-brown or fuliginous sap; pileus and stipe both neither red nor yellow.
 - D. With a margined bulb at base; spores 4.8–7 x 4–5.5 μStirps *Circumscissus*, p. 226
 - D. Without a margined bulb.
 - E. Spores 5.5–7.7 x 4–7 μStirps *Plautus*, p. 217
 - E. Spores 4.5–6.5 x 4.3–6.3 μStirps *Aethalus*, p. 223
 - C. Cystidia and cheilocystidia both hyaline, or sometimes slightly melleous from a resinous incrustation, or pileus or stipe or both either red or yellow.
 - F. Pileus and stipe either red or yellow. Stirps *Leoninus*, p. 228
 - F. Pileus and stipe without red and yellow.
 - G. Epicutis of pileus—a trichodermium with acute or sub-acute or acuminate-subobtuse terminal members, these often cystidioid.....Stirps *Fuliginosus*, p. 230
 - G. Terminal members of the epicuticular hyphae broadly rounded at the tip (at least their great majority).
 - H. Pileus white or almost so.....Stirps *Semibulbosus*, p. 236
 - H. Pileus distinctly and usually strongly colored grey, brown, fuscous, fuliginous, chocolate color, umber, or blackish.
 - I. Pileus rugose in the center.....Stirps *Cinereus*, p. 250
 - I. Pileus smooth or squamulose or spinulose in center.
 - J. Spores not quite globose.
 - K. Pileus fibrillose, squamulose, or spinulose in the center and radially fibrillose outwards, mostly showing whitish flesh between the fibrils or outright rimose as *Inocybe fastigata*.
 - L. Cystidia with simple wall or inconspicuously and mostly appressedly incrustated. Subtropical and tropical species.....Stirps *Spilopus*, p. 239
 - L. Cystidia strongly incrustated with loose incrustation in some portions so that wall appears double. Temperate species.
 - K. Pileus mostly more or less fibrillose or flocculose in the center, not radially fibrillose with dissociating appressed fibrils in the marginal zone.....Stirps *Atriavellaneus*, p. 245
 - J. At least a small percentage, sometimes all, spores almost geometrically globose
 - Stirps *Nitens*, p. 253

**P. nigrolineatus* Murr. recently collected in Tucumán (R.S.).

STIRPS PLAUTUS

KEY TO THE SPECIES

- A. Edge of lamellae concolorous with the sides.
- B. Pileus with radial fibrils which are brownish cinereous to cinereous. Cystidia if at all, extremely weakly pigmented. On wood of Urticaceae (see *P. rimosellus*)
- B. Pileus either not rimose, or darker colored, or not on Urticaceae. If pileus rimose, cystidia more distinctly pigmented.
- C. Pileus smooth and with entire cuticle, not radially sulcate and not radially fibrillose-rimose; spores rather large: 7-8-(9) x 6-6.7-(8) μ . Juan Fernandez Islands..... (see "E": *P. fernandezianus*)
- C. Pileus either sulcate or rimose., or both; spores slightly smaller. Subtropical and tropical species.
- D. Stipe white and remaining so, often compressed. Cystidia pale gray to hyaline. Amazonas to Gulf of Mexico..... 11. *P. compressipes*
- D. Stipe becoming brown fibrillose. Cystidia more distinctly pigmented, at least many of them. Argentina to East Central Brazil..... 12. *P. subfibrillosus*
- A. Edge of lamellae discolorous.
- E. Stipe white or at least not fuscous-fuliginous-fibrillose, equal Juan Fernandez..... 13. *P. fernandezianus*
- E. Stipe fuscous-fuliginous-fibrillose, tapering upwards. Valdivia, Western Patagonia, Tierra del Fuego, Central Chile..... 14. *P. jaffuelii*

11. *PLUTEUS COMPRESSIPES* Murr., North Amer. Flor. **10**: 137. 1917.
—Fig. 6.

Pileus in the center at first fuliginous becoming watery-subhygrophanous in older specimens, marginal region paler isabelline to pallid, later *burnt umber* (M&P 15-A-12) fibrillose on pallid ground or paler ground, slightly uneven but not rugose-venose in the center when young, marginal region finely sulcate when young, subglabrous (under a lens appearing slightly subflocculose-subfibrillose in dried condition), but eventually becoming plicate-pectinate over about three quarters of the radius, and there radially innately fibrillose showing the white tissue of the trama between fibrils, but not distinctly rimose, not viscid, campanulate-ovoid at first but with applanate truncate apex or even applanate-umbilicate, later repand and flat-convex to applanate, with or without a slight rounded umbo, or subumbonate, eventually depressed around the disc, 30-70 mm. broad. Lamellae white then greyish salmon pink, close or subclose, medium broad or broad, sometimes slightly deliquescent as in *P. neophlebophorus* and presumably in *P. deliquescens*, free. Stipe white and remaining so, smooth, eventually often sulcate in the basal portion, often compressed, glabrous, equal, 30-90 x 2-7 mm. basal mycelium white cottony. Context white, slightly greyish inside the base; odor none.—Spores 5.5-7 x 4.3-6.5 μ , subglobose or ovoid or short cylindric, smooth, pinkish stramineous. Hymenium: Basidia 4-spored. Cystidia 27-44 μ long in young specimens later stretching to 40-48 x 11-19 μ , at first predominantly pale grey from an evenly dissolved intracellular pigment, later only a small percentage faintly pigmented, smooth, very versiform, especially in old carpophores, varying from vesiculose-ventricose, with short attenuated but broadly rounded mucro, to ampullaceous (with broadly-ventricose base and a relatively thin, often repeatedly attenuated or constricted and thus at times subcapitate apex, pedicellate),

quill-shaped, etc. Cheilocystidia numerous, very similar in shape and size to pleurocystidia but generally less colored and predominantly to exclusively hyaline, more often short vesiculose than pleurocystidia. Hyphae without clamp connections. Covering layer of pileus: Epicutis characteristically non-palisadic, although there may be some cystidiform terminal members which are perhaps semi-erect or ascendant in bunches, but basically forming a cutis of parallel hyphae, all filamentous; terminal members with broadly rounded tips or occasionally abruptly acute, never attenuate-subacute.

On rotting dicotyledonous wood in low rain forest vegetation.

BOLIVIA: Oriente (Dpto. Beni): Vaca Diez, Riheralta. Singer B 2337, B 2338, 30-III-1956, (LIL). JAMAICA, Castleton Garden, type (NY).

The type analysis (see Trans. Brit. Myc. Soc. **39**: 156. 1956) was not fully conclusive so that I had doubts whether this species is too close to *P. atriavellaneus* or *P. albstipitatus*. However, the Amazonas collection seems to show that this species is sufficiently different from both since the young specimens (B 2337) have distinctly grey cystidia which puts this species near *P. subfibrillosus*. My present interpretation of Murrill's species still needs confirmation from Jamaican recollections, but as long as such topotypical material is not available, my identification of B 2337-2338 can hardly be challenged, inasmuch as it even has the compressed stipes emphasized by Murrill. The description given above is entirely based on Bolivian material.

12. *PLUTEUS SUBFIBRILLOSUS* Sing., Trans. Brit. Myc. Soc. **39**: 187. 1956; *ibid.* fig. 36.

Pileus porphyry brown or fuliginous, umber or dark grey, later fading to light grey or fuscous, with somewhat paler marginal zone, uniformly finely velutinous, then becoming fibrillose, at maturity distinctly fibrillose-punctate to rimosely split between fibrils near margin and at the same time with a short or medium long sulcation, slightly venose in youth in some caps, otherwise quite smooth, conical to campanulate and truncate at apex, later expanding and finally becoming convex to applanate and subumbonate to umbonate, 30-60 mm. broad. Lamellae white, then pink, with white to pink edges, close broad, ventricose, free. Stipe white in very young specimens, later finely brownish punctulate-fibrillose, eventually with closely appressed longitudinal umber fibrils, but usually leaving the upper one to two-thirds white, glabrous in the upper portion, indistinctly longitudinally sulcate to deeply sulcate, 30-70 x 6-8 mm. (at base; 3.5-4 mm. at thinnest place at or somewhat below the apex, almost always distinctly thickened below). Context white, fleshy, odor none or fungine.

Spores 6-7.5 x 5.3-6.2 μ , subglobose, more rarely short ellipsoid, smooth, pinkish stramineous. Hymenium: Basidia 22-30 x 6.5-8.2 μ . Cheilocystidia 38-42 x 15-19.2 μ , numerous but intermixed with basidia, basidioles, and cystidia of the type occurring on the sides of the lamellae (edge subheteromorphous), saccate-balloon-shaped with transitions towards the typical form of the pleurocystidia, attenuated below into a small pedicel, hyaline. Pleurocystidia few to rather numerous, some

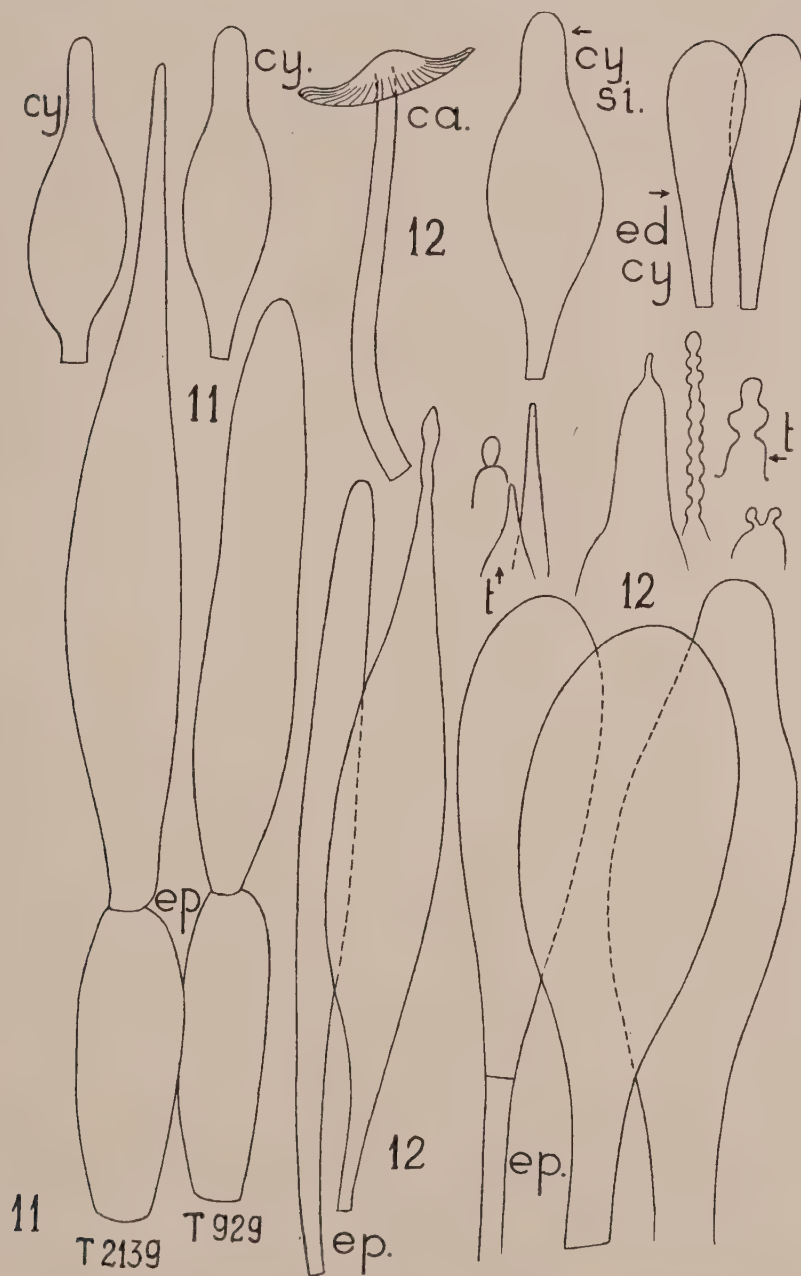


PLATE 6. FIG. 11. *P. argentinensis*, cy=cystidia, x 900; ep=elements of epicutis of pileus, x 900 (numbers correspond to material studied). FIG. 12. *P. yungensis*, ca=carpophore, x 0.9; ep=elements of epicutis of pileus (t=different forms of tips of these elements), x 900; cy si=type of cystidia predominant on sides of lamella, x 900; ed cy=cystidia predominant on edge of lamella, x 900.

small and fusoid (e. gr. $46 \times 6.5 \mu$), most broad ventricose, subampullaceous or more rarely subcapitate, $34-70 \times 12-22 \mu$, not incrustated, without outgrowth at apex and always broadly rounded, hyaline or with fuscous-brownish cell sap (always some with pigmented interior present). Hyphae all without clamp connections. Covering layer of pileus: Epicutis consisting of a palisade which becomes eventually depressed and cutis-like, formed by elongate hyphae whose terminal members are subcystidioid, subcylindric or ventricose-ampullaceous or almost ellipsoid-ventricose, sometimes constricted, constantly broadly rounded at the tip, all or most filled with dissolved intracellular pigment (brown). Underneath this palisade, there is a hypodermal cutis, with many of its elements also brown pigmented.

On the trunks of trees, mostly dicotyledoneous species, but probably also on *Araucaria*, fruiting from September until January.

BRAZIL: Rio de Janeiro, Angra dos Reis, Singer B 433, 30-IX-1952, (F, typus). Rio Grande do Sul, Taimbesinho, Singer B 96, 5-XI-1951 (LIL). ARGENTINA: Prov. Tucumán, Capital, Singer T 796, 29-XII-1949 (LIL).

13. **Pluteus fernandezianus** Sing., spec. nov.,—Fig. 7.

Pileo ferrugineo-fuliginoso, centro tomentoso, marginem versus fuligineo-punctato, ceterum albedo, nec sulcato nec striato, convexo-subumbonato, 14 mm. lato vel latiore. Lamellis brunneolo-vel pallide-fuligineo-marginatis, latissimis, vertricosis. Stipite albo vel subobscurato ad basin sed fibrillis fuscis vel nigris destituto, aequali, 14×1 mm. in siccis. Sporis $7-8-(9) \times 6-6.7 (8) \mu$. Cystidiis hyalinis vel pallide brunneolis. Hyphis defibulatis, in epicute pallisadice dispositis, membris terminalibus $53-72 \times 12.5-21.5 \mu$. Ad truncum emortuum putridum.

Pileus deep rusty fuliginous tomentose in the center, otherwise fuliginous punctate, the dark specks subtomentose on pallid whitish ground, smooth on the margin, convex with slightly subumbonate center, about 14 mm. broad in dried condition, fresh probably broader. Lamellae pinkish, most with brownish to pale fuliginous edge, very broad, very strongly ventricose, subclose, free. Stipe whitish pallid or slightly darkened below, but not fuscous or fuliginous fibrillose even at the base, somewhat pubescent-subpruinose but glabrescent, thin, equal, about as long as the diameter of the pileus and at least 1 mm. broad (1 mm. in dried material). Context white. Spores $7-8-(9.3) \times 6-6.7(8) \mu$, pinkish stramineous, ellipsoid, or short cylindric, smooth. Hymenium: Basidia $21-22 \times 8.5-9 \mu$, 4-spored. Cheilocystidia palest brownish, rarely hyaline, $33-48 \times 8.7-19 \mu$, ventricose, rarely ampullaceous or clavate, making the edge heteromorphous. Pleurocystidia numerous $46-65 \times 8.7-23.3 \mu$, hyaline, fewer pale brownish, ventricose below, mostly ampullaceous, the tip sometimes short apiculate in the center, sometimes sinuate or nodulose at apex.

Hyphae without clamp connections.

Covering layer of pileus: Epicutis consisting of a palisade of cystidioid elements which are mostly pale fuscous, some being hyaline, smooth, ventricose to ventricose-fusoid or ampullaceous, $53-72 \times 12.5-21.5 \mu$, the palisade eventually depressed.

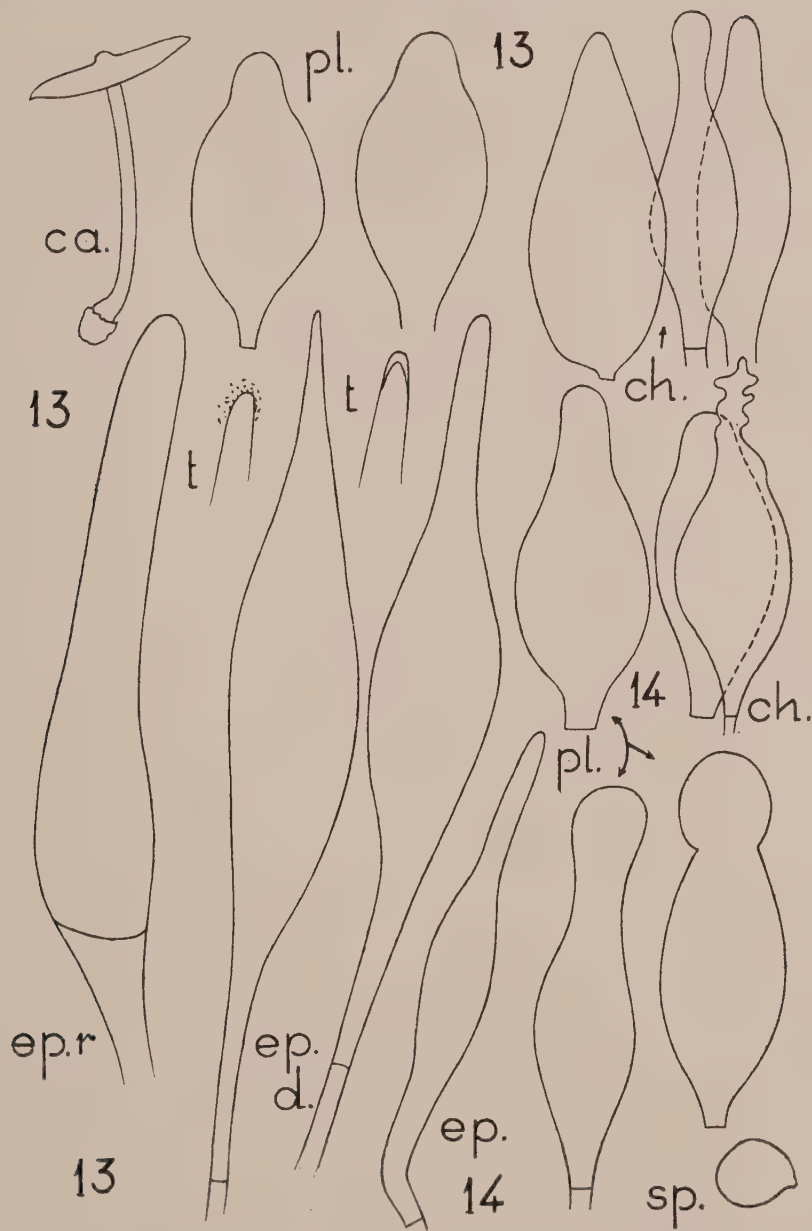


PLATE 7. FIG. 13. *P. pluvialis*, ca=carpophores, x 0.9; pl=pleurocystidia, x 900; ch=cheilocystidia, x 900; ep r=epicuticular elements of radially fibrillose (marginal) zone of pileus, x 900; ep d=elements of the epicutis of the discal portion of the pileus (spinulose part, t=tip with thickened wall, at right; with incrustated wall, at left), x 900. FIG. 14. *P. aquosus*, ep=element of epicutis of pileus, x 900; ch=cheilocystidia, x 900; pl=pleurocystidia, x 900; sp=spore, x 1.800.

On a dead decayed trunk near waterfall. Fruiting in fall.

CHILE: Juan Fernandez: Masatierra, Quebrada Agujereada. B. Sparre F 32, 12-III-1955. (LIL, S, typus).

14. *PLUTEUS JAFFUELI* (Speg.) Sing., Sydowia **8**: 123. 1954. (tr. inv.); Sing.;—Trans. Brit. Myc. Soc. 39; fig. 21. 1956.

Mycena jaffueli Speg., Rev. Chil. Hist. Natur. **21**: 119. 1917.

Pluteus defibulatus Sing., Sydowia **6**: 222. 1952.

Pileus fusco-fuliginous or fuscous-sepia, umber, the marginal portion sometimes slightly paler, on margin slightly striate to short sulcate, otherwise slightly to very strongly rugose, rugose-sulcate, or coarsely venose, not viscid or hygrophanous, subglabrous to granular all over, convex with subumbonate to obtusely umbonate center, the marginal portion eventually applanate, 10–33 mm. broad. Lamellae greyish white, then pink, with deep sepia to fuscous edge, broad, (3–7 mm. broad), close, free, sometimes crenulate. Stipe covered with fibrils which are concolorous with the pileus and somewhat denser below so that the lower part is often deeper colored than the upper which is whitish to greyish underneath, fibrils often furfuraceous or else innate and spirally arranged, stuffed, eventually hollow, tapering upwards or with thickened base, 15–33 x 2–5 mm., basal mycelium strigose or tomentose, whitish to sordid. Context white, often with a watery line above the lamellae. Odor none. Spores 6.2–7.5 x 4.8–7 μ , short-ellipsoid, few ovoid, smooth, without suprahilar depression or applanation, smooth, stramineous. Hymenium: Basidia 19–36 x (5.5–) 8–9 μ , subclavate, 4-spored, sometimes some 1–3-spored. Cheilocystidia 37–68 x 10.3–28 μ , vesiculose to ellipsoid, more rarely ventricose-ampullaceous, mostly with a brown dissolved pigment in the cell sap, sometimes with colloid pigment condensations, numerous. Cystidia on sides of lamellae (30)–48–68 x 10–24 μ , varying from hyaline to pale fuscidulous inside, fusoid-ampullaceous, more rarely fusoid-vesiculose, thin-walled even at the apex, with or without short appendages or excrescences which may at times resemble the prongs of the *cervinus*-type metuloids, but here never metuloid, rather numerous. Hyphae without clamp connections. Subhymenium filamentous; hymenophoral trama invers. Covering layer: Epicutis of pileus either confluent-continuous, or consisting of separate bunches of elongate elements (then: surface granular), terminal members either filamentous or swollen (up to 15 μ), repent and radially depressed, originally ascendant and sub-palisadic with almost cystidioid terminal members which are ventricose or clavate, attenuate-obtuse or broadly rounded, 66–150 x 13.8–30.8 μ , all or most filled with a brown sap. Outermost layers of the stipe with thinner hyphae than the internal ones of the cortical layer, brown inside.

On decayed trunks, rotting wood mixed with earth, etc., in *Nothofagus pumilio* and *N. dombeyi* woods, also on such hosts as either *Cytharexylon* or *Cryptocaria*, in summer and fall, Tierra del Fuego, Patagonia and north to Central Chile.

CHILE: Prov. Valparaiso, "Los Perales" near Marga-Marga, N. Costes, (LPS 2746, typus). ARGENTINA: Tierra del Fuego: Est. "Nueva Argentina" R. Singer M 435, 22-II-1950 (LIL, typus of *P.*

defibulatus). Neuquén, Parque Nacional Nahuel Huapi, Quetrihué, (LIL, R. Singer, M 639, 15-V-1952 (LIL). Villa Angostura, I. Gamundi, no. 377, 30-IV-1958 (BAFS).

This species is close to *P. umbrosus*, a European species with slightly smaller spores, often thick walls at the apices of the terminal members of the epicuticular hyphae, and somewhat larger fruiting bodies.

STIRPS AETHALUS

Epicutis consisting of erect moderately long, often rather short, obtuse or subacute to acute cells in palisadic arrangement or sub-hymeniform. Edge of lamellae discolorous. Spores small and almost globose to geometrically globose $4.5-6.5 \times 4.3-6.3 \mu$. Many cystidia especially cheilocystidia brown. This stirps is the closest any representatives of sect. *Hispidoderma* come to sect. *Mixtinus* even though the smaller elements often found in *P. aethalus* are never spherocysts.

KEY TO THE SPECIES

- A. Terminal members of the covering layer of the pileus obtuse, rounded at tip 15. *P. eupigmentatus*
- A. Terminal members of the covering layers of pileus and stipe mostly acute to subacute. 16. *P. aethalus*

15. *Pluteus eupigmentatus* Sing., spec. nov. ad int.,— Fig. 8.

Pileus a very deep sepia brown, blackish sepia, *conga* to *piccaninni* (M&P 8-E/H-11), subvelutinous-subglabrous, eventually often finely and densely dark pruinose-furfuraceous on whitish ground, smooth except for short-sulcate margin, but on drying often showing a few radiating veins, conic-campanulate, eventually more convex, slightly small-umbonate, 6-8 mm. broad, up to 5 mm. high. Lamellae white or greyish-white, then pink or sordid pink, with fuliginous or fuliginous-grey edge, sometimes fuliginous when wounded, close, ventricose, broad, free. Stipe grey, or hyaline with very fine innate fuliginous fibrils, otherwise glabrous, smooth, equal, $13-14 \times 1-1\frac{1}{4}$ mm.; mycelium white. Context white, often turning fuliginous in lamellar, trama, inodorous. Spores $4.5-6.7 \times 4.3-6.5 \mu$, almost geometrically globose, only a minority subglobose ($5.5 \times 5 \mu$; $5.5 \times 5.5 \mu$; $6.2 \times 5.8 \mu$), smooth, pinkish-stramineous. Hymenium: Basidia $19-27 \times 5.8-8.2 \mu$, clavate (attenuate apex very short!), hyaline, 4-spored. Cheilocystidia crowded and forming a subheteromorphous edge, $20-39 \times 8-19 \mu$, with evenly dissolved or locally condensed fuscous pigment, with few pigmentless (hyaline) ones intermixed, (pigmentation rather variable), vesiculose-clavate-pedicellate to broadly fusoid-ventricose or clavate or cylindric, rarely subcapitate, always with broadly rounded tip, thin-walled, easily collapsing. Cystidia on sides of lamellae basically identical with those on edge (cheilocystidia) but more scattered, broader on an average, relatively fewer pigmented ones present, also very easily collapsing. Hyphae without clamp connections. Covering layers: Epicutis of pileus characteristically almost hymeniform-palisadic, consisting of crowded cystidioid elements which have the shape of the cheilocystidia and approximately their size, all filled with deep brown-fuscous pigment, dissolved or/and condensed to solid pigment bodies, $24-41 \times 8-14 \mu$; spherocysts none.

On rotting dicotyledoneous trunks, and rotten wet logs, in abandoned plantations and in the forest, solitary.

BOLIVIA: Nor-Yungas (La Paz): Coroico. Singer B 850, 3-II-1956 (LIL). ARGENTINA: Prov. Tucumán, Rio de los Sosas, Singer T 2137, 4-II-1955, (LIL).

As for possible identity of this species with *P. tephrostictus* see comments on the following species.

16. *PLUTEUS AETHALUS* (Berk. & Curt.) Sacc., Syll. Fung. **5**: 674. 1887;—Trans. Brit. Mycol. Soc. 39, fig. 1, 1956; Bull. Soc. Myc. Fr. 69, pl. 4, fig. 8. 1953.

Agaricus aethalus Berk. & Curt., Journ. Linn. Soc. **10**: 289. 1868.

?*Agaricus tephrostictus* Berk. & Curt. Journ. Linn. Soc. **10**: 289. 1868.

?*Pluteus tephrostictus* (Berk. & Curt.) Sacc. Syll. Fung. **5**: 669. 1887.

Pileus chestnut or darker, velvety-pruinose to densely flocculose-punctate, convex with umbo, 5–24 mm. broad. Lamellae white, then pink, with almost black dots denticulate at the edge, close, broad (4 mm.), free. Stipe grey, dotted with blackish tufts of pilose cells or floccose, equal to slightly tapering upward, often slightly curved, solid, 12–27 x 0.5–2 mm. Context pale grey, thin; odor not reported. Spores 4.5–5 x 4.3–4.5 μ , not geometrically globose but subglobose and little longer than broad, smooth, stramineous-pinkish. Hymenium: Basidia e. gr. 22 x 5.5 μ , 4-spored. Cheilocystidia e. gr. 70–80 x 16–25 μ (Dennis), ventricose to ventricose-ampullaceous, filled with a brown sap. Cystidia on sides of lamellae e. gr. 41 x 15.2 μ , gradually attenuated upward or broadly ampullaceous, some hyaline, some filled by a fuscous cell sap. Hyphae without clamp connections. Covering layers: Epicutis of pileus formed by bunches of basically elongate (up to 200 x 13–16 μ) and shorter, more cystidioid (50–120 x 13–20 μ) erect to suberect elements, the majority ventricose in the middle and with attenuate, mostly subacute apex, with equally dissolved or locally condensed brown pigment. Similar but often more variable and perhaps more often obtuse elements on the stipe. Both on pileus and stipe strongly shortened elements rare and inconstant, but terminal members occasionally arising from a small subisodiametric (hypodermial) cell.

On rotten logs.

CUBA: Wright 1857 (no number) (K, FH, typus). TRINIDAD: Dennis no. 413 (K).

The identity of *P. tephrostictus* is very probable. In the material of the type (FH) studied by me, the number of terminal elements of the epicutis of the pileus with round tips was larger than in *P. aethalus* and therefore, this species approaches somewhat *P. eupigmentatus*. The spores are likewise somewhat larger than in typical *P. aethalus* (in *P. tephrostictus*: 5.8–6.5 μ , globose) and the context seems to be white when fresh.

The slightly larger spores were also observed in one collection (under *P. aethalus*) by Dennis, from Rancho Grande, Maracay, Venezuela, but the descriptive data (which we have partly used in our description above, basing it on Dennis' drawing and notes) seem to come from Trinidad material exclusively. This latter is apparently quite identical with the Cuban type of *P. aethalus* and the Venezuelan specimen (Dennis V 49) might be *P. tephrostictus*.

If *P. tephrostictus* is different from *P. aethalus*, it may well be identical with *P. eupigmentatus*. For this reason I have refrained from describing the latter as a valid new species. If what I describe as *P. eupigmentatus* occurs in Cuba, I would prefer to call it *P. tephrostictus*. But, as I have pointed out before, the type, at least the portion preserved at FH, is in much poorer condition than the type of *P. aethalus*. Consequently, the identity cannot be fully established in one way or the other, from the study of the type specimens alone.

STIRPS CIRCUMSCISSUS

This group is somewhat intermediate between the first and the second as far as spore characters are concerned, but differs from both in showing a marginate bulb. Only a single species is known.

17. *Pluteus circumscissus* Sing., spec. nov.,—Fig. 9.

Pileo spaciceo 10–40 mm. lato. Stipite circumscisso. Sporis 4.8–7 x 4–5.5 μ . Cystidiis fuscidulis praesentibus. Elementis epicuticularibus versiformibus. Ad ramos.

Pileus *Rembrandt*, *chocolate*, *conga*, (M&P, 8-H-9/10/11), fibrillose and radially subrimose-dissolving whereby the white context shows between the fibrils at places, punctate-dotted on and around the disc, convex and flattened around the low umbo, 10–40 mm. broad. Lamellae pink, only very near the margin of the pileus slightly discolored fuliginous at times, otherwise edges concolorous with sides, close, broad, free. Stipe silvery grey-white to white, but finely blackish fibrillose on white ground directly above the basal bulb, not otherwise dark fibrillose and only concolorously innately longitudinally fibrillose, 11–32 x 3 mm. bulb 3–5 mm. broad, margined by a narrow volval belt; volval belt filamentous and circular, fuscous: *Madrid* (M&P 15-C-10). Context white or whitish, inodorous. Spores 4.8–7 x 4–5.5 μ , short ellipsoid, smooth, stramineous pinkish.

Hymenium: Basidia 22–29 x 7.5–8.5 μ , ventricose-ampullaceous, 4-spored. Cheilocystidia and pleurocystidia identical, more numerous at edge, but still numerous on sides, of two types, a short type 30–38 x 12–18 μ , broadly ventricose to obtusely mucronate, and an elongate type, 40–55 x 11–13 μ , ampullaceous, more often hyaline in the elongate type, and more often fuscous (with evenly distributed dissolved intracellular pigment or with indistinct pigment condensations), with thin or almost thin wall in both types, and often collapsing, but with a resinous incrustation which is hyaline, hyaline-melleous or melleous and showing a rigid elliptic outline which covers part of the cystidium, usually the apex, which in the elongate type is about 8–9 μ broad (measurements all *with* the incrustations). Resinous incrustation up to 9 μ thick. Hyphae without clamp connections. Last subhymenium cell below the cystidia usually short-cylindric and about 8–9 μ long. Covering layer of pileus: Epicutis consisting of a layer of repent, or ascendent cystidioid terminal members of the hyphae of an underlying cutis (forming the hypodermium), these terminal cells rarely without pigment, usually without distinct gelatinous pigment condensations, fairly evenly dissolved in the cell sap of epicuticular and hypodermal hyphae; the terminal elements of three types: (1) fusoid-ventricose

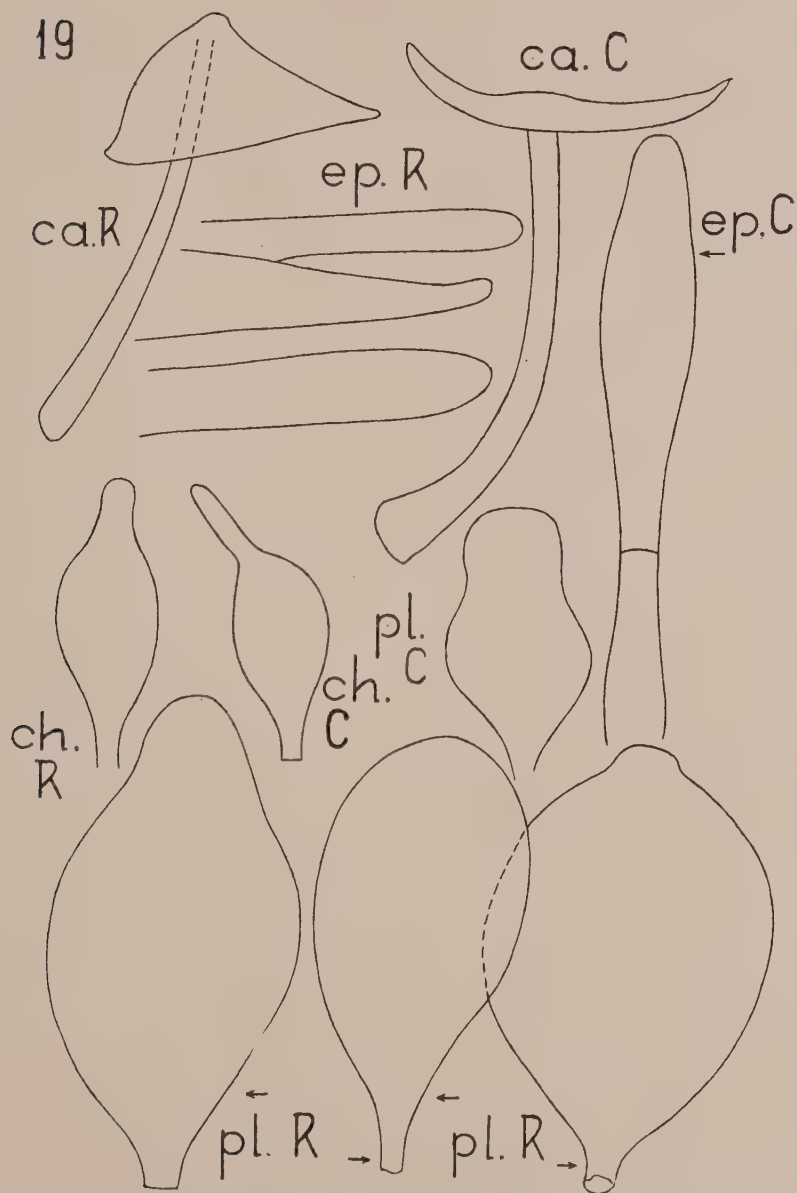


PLATE 9. FIG. 19. *P. riberaletensis* var. *riberaletensis* (R) and var. *conquistensis* (C), ca=carpophores, x 0.9; ep=elements of epicutis of pileus, x 900, ch=cheilocystidia, x 900; pl=pleurocystidia, x 900.

and broadest in the middle, with the apex attenuated into a "neck" which is usually about $4\ \mu$ thick, $140\text{--}147 \times 9.5\text{--}20.7\ \mu$, often with one to two constrictions and thus at times appearing subcapitate; (2) clavate-ventricose and broadest above the middle with a short attenuate but not very broad mucro, $82\text{--}138 \times 14\text{--}18\ \mu$; (3) fusoid-ventricose but without a distinct attenuation above or only slightly attenuated to a broadly rounded (sometimes subcapitate) apex, $82\text{--}100 \times 17.8\text{--}19.3\ \mu$; all types with rather thin wall but sometimes wall thickened to $1.2\ \mu$ just underneath extreme tip of cell.

On dead branch of a dicotyledoneous tree in mountain tropical forest.

BOLIVIA: La Paz: Nor-Yungas; Carmen Pampa, Singer B 12185, 17-II-1956 (LIL, typus).

This species is extraordinary in this section and may be compared only with *P. stephanobasis*. Both form a transition to the genus *Volvariella*. The combination of a subacute and a broadly rounded type of epicuticular terminal cell, and of strongly incrustated and at the same time often internally pigmented cystidia would be enough to separate this species even though it did not have the volval character.

STIRPS LEONINUS

This stirps, rather rich in species in Europe, temperate Asia, and North America, is here represented by a single, but very striking species.

18. *Pluteus rubrotomentosus* Sing., spec. nov.,—Fig. 10.

Pileo laete rubro, squamuloso-tomentoso. Lamellis flavis. Stipite rubro ad apicem basinque, ceterum flavo. Sporis globosis vel subglobosis $4.8\text{--}7 \times 4.8\text{--}6.3\ \mu$; hyphis epicutis trichodermaliter dispositis; fibulis absentibus. Ad truncum dejectum.

Pileus bright red (*Poinsettia*, M&P 2-L-9) tomentose, continuously tomentose in center, tomentose-squamulose on yellow (*snowshoe*, M&P 10-K-7), ground otherwise but so finely the surface may look subglabrous macroscopically, strongly sulcate almost to the disc, convex, umbonate, 16 mm. broad. Lamellae *snowshoe* (M&P 10-K-7), close, broad, ventricose free. Stipe *Spanish y.* (10-L-7 of M&P: a deep golden yellow) in the middle, the apex and the base concolorous with the tomentum of the pileus, the apex from a slight red pruina, the base from a tomentum identical with that of the pileus and continuing it but less conspicuous and easily overlooked, equal with a very slight bulb, 12×2.5 mm., bulb almost 2 mm. broad. Context somewhat yellow, unchanging, inodorous. Spores $4.8\text{--}7 \times 4.8\text{--}6.3\ \mu$, varying from almost geometrically globose to subglobose, smooth, stramineous-pinkish. Hymenium: Cheilocystidia making edge of lamellae almost subheteromorphous. Hyaline inside, but incrustated by a granular substance (which may be an intercellular leuco-pigment), $24\text{--}40\text{--}(44) \times (4\text{--}7)\text{--}8\text{--}17.5\ \mu$, cylindrical, clavate, ellipsoid-oblong, ventricose-short-ampullaceous, fusoid with broadly rounded apex. Cystidia on sides of lamellae scattered, $24\text{--}40 \times 8.2\text{--}11.2\ \mu$, clavate-subvesiculose, hyaline. Hyphae without clamp connections (or perhaps rarely with a clamp or pseudo-clamp in the covering layer?), without clamps at the base of basidia and

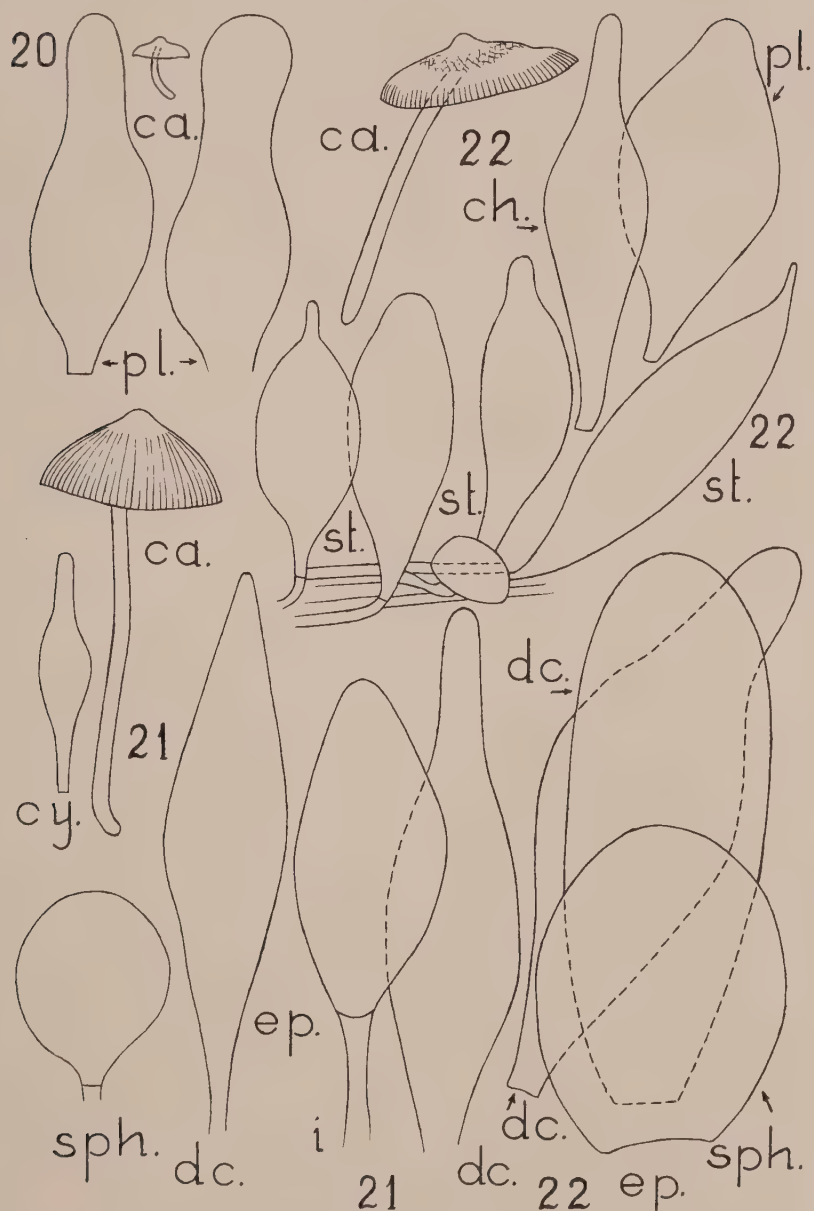


PLATE 10. FIG. 20. *P. eugraptus*, ca=carpophore, x 0.9; pl=pleurocystidia, x 900. FIG. 21. *P. longistriatus* (Salta material), ca=carpophore, x 0.9; cy=cystidium, x 900; ep=elements of epicutis of pileus (sph=spherocysts, i=intermediate element, dc=dermatocystidium), x 900. FIG. 22. *P. neophlebophorus*, type, ca=carpophore, x 0.9; ch=cheilocystidium, x 900; pl=pleurocystidium, x 900; st=covering layer of stipe, x 900.

cystidia, Hymenophoral trama hyaline, inverse. Covering layers: Epicutis of pileus consisting of elongated elements which form a (interwoven) trichodermium, yellowish to hyaline and partly covered by the same incrustation as the cheilocystidia, the terminal members versiform but always with broadly rounded tip, cylindric or slightly ventricose, $48-96 \times 11-41 \mu$.

On dicotyledonous log in mountain tropical forest, fruiting in summer.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas: Rio Yariza. R. Singer, B 1412, 23-II-1956. (LIL, typus).

Easily recognizable as the only red species without spherocysts on the pileus. *Pluteus rubrotomentosus* seems to be rather rare, at least in the part of the Yungas studied by us.

STIRPS FULIGINOSUS

Carpophores without bright pigment, the cystidia or cheilocystidia not with colored cell sap (intracellular pigment), the terminal members of the hyphae of the epicutis of the central portion of the pileus with acute to subacute or at least strongly and evenly attenuated apex, none or few broadly rounded.

KEY TO THE SPECIES

- A. Pileus conic to companulate, not expanding or carpophores fasciculate North American races or species *P. fuliginosus* Murr. and *P. rhoadsii* Murr. (not observed in South America).
- A. Pileus at first often more or less conic-campanulate, but soon expanding to convex or applanate. Carpophores not growing in fascicles. South America.
 - B. Pileus uniformly umber fibrillose fuzzy all over; spores $6.2-7.5 \times 4.8-6.5 \mu$. Stipe fuliginous-fibrillose below. On very wet shady place, woody humus, or decayed wood in Argentina.....19. *P. argentinensis*
 - B. Center of pileus usually finely spinulose when dried, margin appressedly radially fibrillose and occasionally \pm rimose; spores as above and then cystidia thick resinously incrustated or spores more globose $5.5-7 \times 4.8-6.7 \mu$. On rotting leaves and trunks, tropical forest. Stipe white when fresh.
 - C. Pileus not long plicate. Mature spores $5.8-8.2 \times 5-7-(7.5) \mu$ always short ellipsoid to subglobose, most frequently around $7 \times 6.3 \mu$. Cystidia thick-resinous-incrustated. On leaves in mountain forest.....20. *P. yungensis*
 - C. Pileus long plicate. Mature spores $5.5-7 \times 4.8-6.7 \mu$, always subglobose to globose. Cystidia less strongly incrustated. On wood. Rain forest of the Amazonas.....21. *P. pluvialis*

19. *Pluteus argentinensis* Sing. spec. nov.,—Fig. 11.

Pileo umbrino-fibrilluloso, 22-35 mm. lato, dein expanso. Lamellis haud atomarginatis. Stipite fuligineo-fibrilloso basin versus. Sporidii $6.2-7.5 \times 4.8-6.5 \mu$. Cystidiis inconspicue incrustatis. Hyphis terminalibus epicuticularibus fortiter gradatim attenuatis apice tenuibus subobtusis, defibulatis. Ad lignum dicotyledoneum putridum in silva subtropicali.

Pileus strongly and densely umber fibrillose on white ground all over, or densely fuzzy and eventually radially fibrillose, showing, when dry, the pallid ground colour between the fibrils (s.l.), although not distinctly rimose with sulcate margin, convex then applanate, with

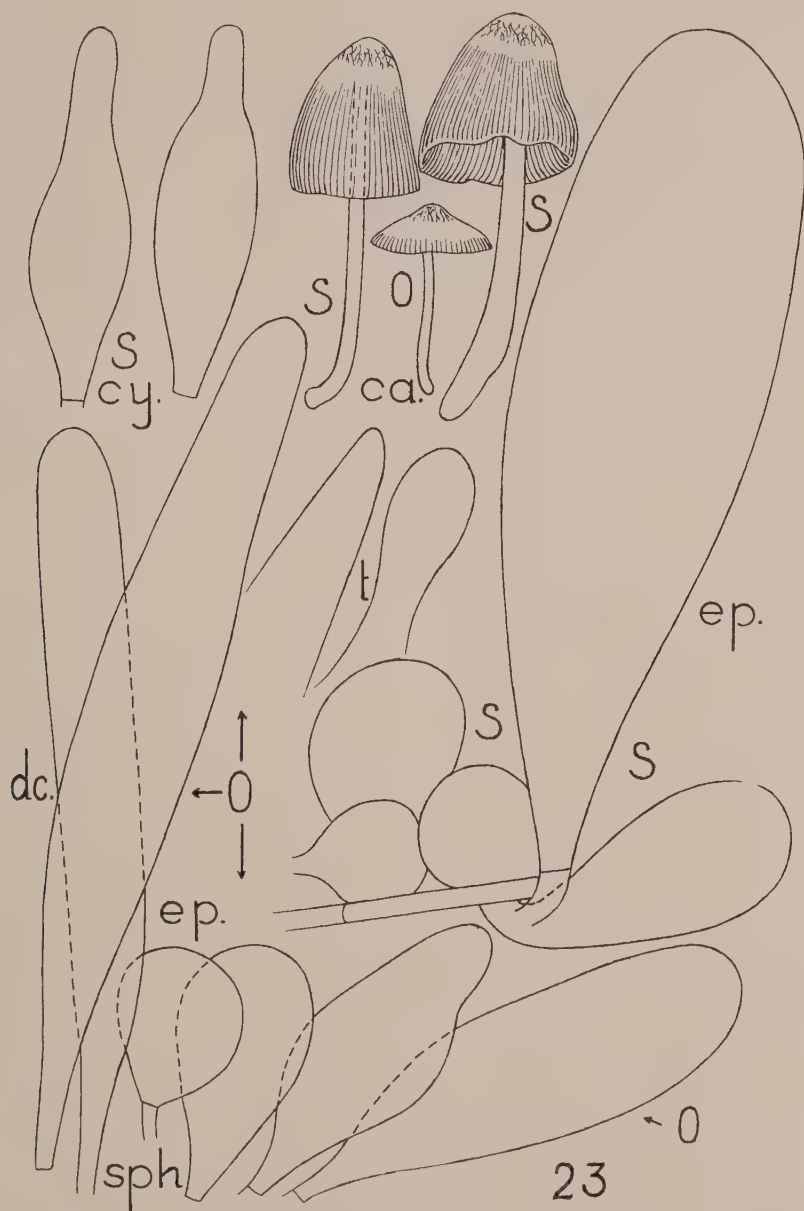


PLATE 11. FIG. 23. *P. neophlebophorus* f. *sublongistriatus* (S) and f. *olivaceo-griseus* (O), cy=cystidia, x 900; ca=carpophores, x 0.9; ep=elements of epicutis of pileus (sph=spherocysts, dc=dermatocystidia, t=tip shapes of epicuticular terminal elements), x 900.

umbonate or obtuse center, 22–35 mm. broad. Lamellae pink, often with pallid edge, moderately close to close, 3–4 mm. broad, free. Stipe white, but lower half or at least basal region with umber or blackish fibrils, tapering upwards, 28–63 x 1.5–3 mm., base sometimes up to 7 mm. broad. Context white, unchanging, inodorous. Spores 6.2–7.5 x 4.8–6.5 μ . Hymenium: Basidia 22–26 x 7.8.2 μ , 4-spored; cystidia ventricose below and ampullaceous or mucronate above, at edge also some ventricose-vesiculose or ampullaceous-subcapitate, hyaline, some with an inconspicuous stramineous resinous incrustation, with hyaline contents, numerous, 34–68 x 14–25 μ , mostly 42–54 x 14–19 μ . Hyphae all without clamp connections. Covering layer: Epicutis consisting of ventricose to cylindrical hyphal chains with evenly dissolved fuscous pigment, the terminal member fusoid to ventricose with strongly attenuate apex, with a thin subobtuse tip, 91–127 x 16.5–18.7 μ .

On rotten wood, very shady and wet places in subtropical forest.

ARGENTINA: Prov. Tucumán, Río de los Sosas, between 1000 and 1200 m., Singer T 929 (LIL). T 2139 (LIL, typus).

This differs from *P. fuliginosus* in habit and habitat, from *P. hispidulus* f. *terrestris* Kuehner in the fibrillose stipe.

20. *Pluteus yungensis* Sing., spec. nov.,—Fig. 12.

Pileo in centro velutino dein velutino-subspinuloso-squarruloso, marginem versus appresse fibrilloso dein subrimoso vel rimoso, convexo dein applanato, umbone obtuso, 29 mm. lato. Lamellis haud atromarginatis. Stipite albo in vivis, grisello-subflocculoso basin versus in siccis, albomycelioso. Sporis 5.8–8.2 x 5–7 μ . Cystidiis cheilocystidiisque hyalinis, pleurocystidiis crasse incrustatis massa resinosa. Hyphis terminalibus epicuticularibus centri pilei apice tenuibus vel acutis vel appendiculatis. Ad folia in silva tropicali montana.

Pileus deep brown with black brown umbo, on umbo velutinous but covering on drying slightly dissociating and becoming very finely (use lens) velutinous-subspinulose-squarrulose, otherwise appressedly fibrillose and the fibrils eventually dissociating, the surface then becoming rimose, convex, then flat with obtuse umbo, eventually often partly concave, 29 mm. broad. Lamellae pink with pink edge, close, medium broad, or rather narrow, free. Stipe white when fresh, not fibrillose when fresh except from the white basal mycelium, appearing faintly greyish subflocculose at base when dried, tapering upward, not bulbous, not with margined base, 60 x 3 (apex, 5 (base) mm. Basal mycelium white, abundant. Context white, unchanging, inodorous. Spores 5.8–8.2 x 5–7 (7.5) μ , most frequently 7 x 6.3 μ , the younger and smaller ones usually more subglobose, the older or larger ones mostly short ellipsoid, smooth, pinkish stramineous. Hymenium: Basidia 22–27.5 x 8.2–9.3 μ , 4-spored. Cheilocystidia mostly clavate and 32–55 x 11.7–16.5 μ , but also ventricose-ampullaceous (like the majority of the pleurocystidia), hyaline. Cystidia on sides of lamellae ventricose-ampullaceous, or with the apex slightly thickened (subcapitate), 55–71 x 13–28 μ , apex 6.2–13.8 μ diam., hyaline, fewer clavate and like the majority of the cheilocystidia, pedicellate (pedicel 2.5–6.8 μ diam.) or not, with a very thick round resinous incrustation

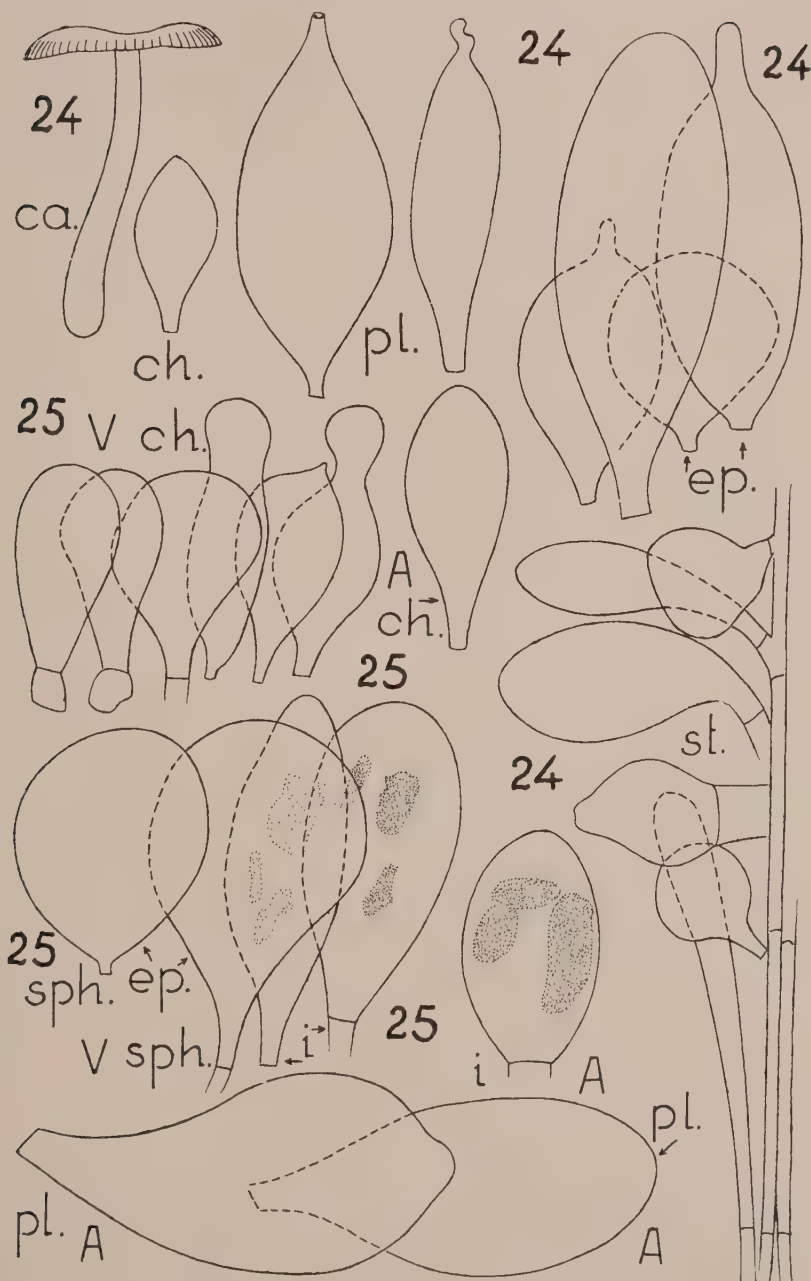


PLATE 12. FIG. 24. *P. sanctixaverii*, ca=carpophore x 0.9; ch=cheilocystidium, x 900; pl=pleurocystidia, x 900; ep=elements of epicutis of pileus, x 900; st=covering layer of stipe, x 900. FIG. 25. *P. variipes* var. *variipes*, (V) and var. *atrofibrillosus* (A), ch=cheilocystidia, x 900; ep=elements of epicutis of pileus (sph=spherocysts, i=intermediate elements, x 900; pl.=pleurocystidia, x 900.

in the upper portion but this falling off easily. Hyphae all without clamp connections. Covering layer of the pileus: Epicutis consisting of broad and broadly rounded elements mixed with fusoid and mostly narrowly mucronate or ampullaceous elements, the latter, more rarely the former, with (or without) a secondary capitulum or appendage, all either hyaline or with fuscous uniformly dissolved intracellular pigment, some of the terminal elements thin and subcylindrical ($38-96 \times 6.8-16.5 \mu$), but $\times 7.5-16.5 \mu$ in the fusiform type.

On dicotyledonous leaves in tropical montane forests, fruiting in summer.

BOLIVIA: La Paz: Prov. Nor-Yungas, Rio Llolosa, R. Singer B 777, 31-I-1956 (LIL, typus).

This species is close to *P. fuliginosus* and exhibits some characters also observed in *P. circumscissus* but differs from the latter in the absence of fuscous pigment in the cystidia, larger spores, absence of fuscous pigment in the cystidia, larger spores, absence of margined bulb. It differs from the European *P. hispidulus* f. *terrestris* in somewhat broader spores and different surface of the pileus; it has more numerous pleurocystidia and a different habitat.

21. *Pluteus pluvialis* Sing., spec. nov.,—Fig. 13.

Pileo tomentoso dein tomentoso-subspinuloso-granulari fuligineo supra fundamentum avellaneo-fuscum, dein marginem versus radiatim appresse fibrilloso atque vix rimoso, longe plicato-sulcato, convexo-applanato, umbone parvo instructo. Lamellis acie atra destitutis. Stipite candido, bulbo albopubescente abrupto instructo. Sporibus globosis vel subglobosis, $5.5-7 \times 4.8-6.7 \mu$; cystidiis cheilocystidiisque hyalinis, saepe fugaciter incrustatis, hyphis apicibus liberis rotundato-obtusis praeditis in epicute partis marginalis pilei sed subacuminatis in parte centrali; hyphis defibulatis. Ad ligna.

Pileus avellaneous-fuscous with fuliginous granular punctations (s.l. tomentose-subspinulose particles) all over but particularly in the center, where they are very dense and appearing definitely tomentose in dried condition, later becoming finely subspinulose there, with radial appressed fibrils around the center and, although not truly rimose, plicate-sulcate over two-thirds of the radius and when dried very short furrowed-sulcate and the sulci continuing a short way inward by rimulose crevasses, convex, soon convex-applanate, depressed around a small low umbo, 22–31 mm. broad. Lamellae pink with pink edge, close, medium broad, free. Stipe entirely pure white and

EXPLANATION OF PLATE 13

PLATE 13. FIG. 26. *P. oligocystis*, ca=carpophore, $\times 0.9$; ch=cheilocystidia, $\times 900$; ep=elements of epicutis of pileus (sph=spherocysts, i=intermediate elements, dc=dermatocystidium), $\times 900$. FIG. 27. *P. subminutus* (A=material from Argentina, B=from Bolivia); ep=elements of epicutis of pileus, $\times 900$; ca=carpophore, $\times 0.9$; ch=cheilocystidia, $\times 900$; pl=pleurocystidia, $\times 900$; sp=spore, $\times 1.800$. FIG. 28. *P. polycystis*, ca. m.=mature carpophore, $\times 0.9$; ca y=young carpophore, $\times 900$; ep=elements of mature epicutis of pileus, $\times 900$; ep. y=palisade of the young pileus epicutis, $\times 900$.

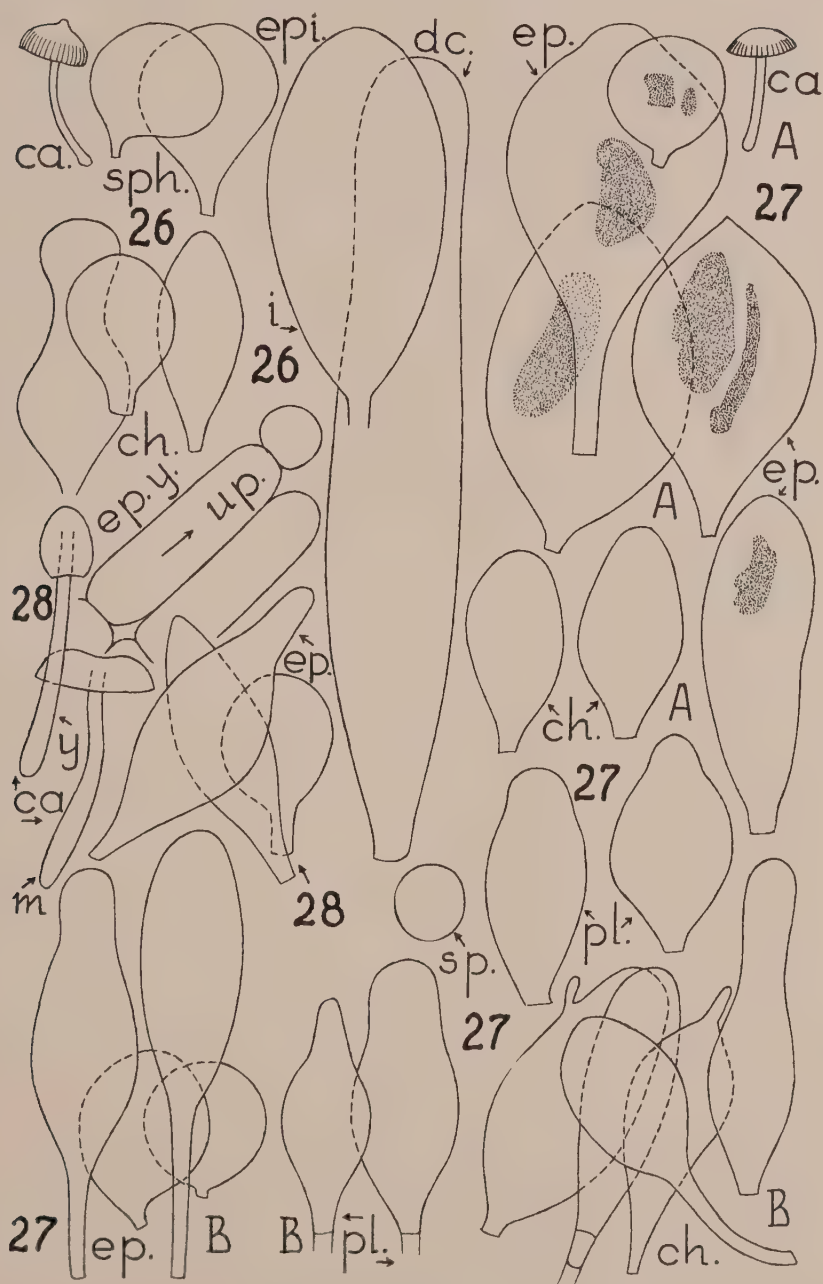


PLATE 13

glabrous, and smooth, subequal or slightly tapering upward but with an abruptly pubescent (and therefore seemingly margined) pure white bulb, 20–45 x 1–3 mm. Context white, inodorous. Spores 5.5–7 x 4.8–6.7 μ , subglobose but some almost geometrically globose, 0.2–0.5 μ longer than broad, smooth, stramineous-pinkish. Hymenium: Basidia 22 x 7.5–8.2 μ , 4-spored. Cheilocystidia numerous and versiform, 40–55 x 7–21 μ , ventricose below and narrower at apex, subcapitate, subampullaceous or gradually attenuated toward the tip which, however, is always broadly rounded, hyaline, thin-walled, capitulum (where present) about 6–6.5 μ thick. Cystidia on side of lamellae of the same size as the cheilocystidia and also otherwise similar but almost constantly broadly ventricose above and with short broad mucro above, often with a stramineous hyaline fugacious and not very striking resinous incrustation. Hyphae without clamp connections. Covering layer of pileus: Epicutis in the radially fibrillose outer zone of pileus formed by elongated elements the terminal members of which are broader near the last septum, and then gradually tapering or ampullaceous with thinner apex which however is always broadly rounded and often still relatively broad; the terminal members of the bunches of hyphae which form the epicutis of the umbo (the spinules) more cystidioid and with thinner apex (4.7–3.8 μ diam.), but never more than subacute (not acute), brown, 82–165 x 16.5–19.5 μ .

On rotting dicotyledonous wood in rain forest.

BOLIVIA: Oriente (Dpto. Pando: Prov. Manuripi, Conquista (Rio Madre de Dios) Singer B 2194, 25–III–1956. (LIL, typus).

This, at first, was thought to be a form of *P. nitens*, but, even if it were assumed that the subacute elements of the epicutis of the center were missed in former anatomical studies of the Mexican type of *P. nitens* or are assumed to be variable, it still remains remarkable that the pileus is so much less striate in the type of the Mexican species, that its stipe does not show any abrupt change from pubescent to glabrous, and that the spores are more often truly globose and smaller.

The long-pectinate pileus and the white stipe are characteristic as far as the species of this stirps are concerned, including the exotic ones. *P. riberaaltensis* is more rimose, not spinulose, darker and larger.

STIRPS SEMIBULBOSUS

KEY TO THE SPECIES

- A. Pileus without dark fibrils even when young and fresh.....*P. aquosus*
 A. Pileus with scattered fine dark fibrils.....*P. haywardii*

EXPLANATION OF PLATE 14

PLATE 14. FIG. 29. *P. polycystis*, pl=pleurocystidium, x 900. FIG. 30. *P. umbrinalbidus*, ep=elements of epicutis of pileus (sph=spherozyst, dc=dermatocystidium, t₁ and t₂=variant types of dermatocystidal tips), x 900. FIG. 31. *P. substigmaticus* pl=pleurocystidia, x 900; ca=carpophore, x 0.9; ep=elements of epicutis of pileus (sph=spherozyst, dc=dermatocystidium), x 900. FIG. 32. *P. laetus*, ca=carpophore, x 0.9; b=basidium, x 900; cy=cystidia, x 900; ep=elements of epicutis of pileus (sph=spherozyst, dc=dermatocystidia), x 900. FIG. 33. *P. laetifrons* (L=type, and B=var. *bolivianus*), sp=spores, x 1.800; sph.=spherozyst of epithelium of pileus; x 900; ca=carpophores, x 0.9; cy=cystidia, x 900.

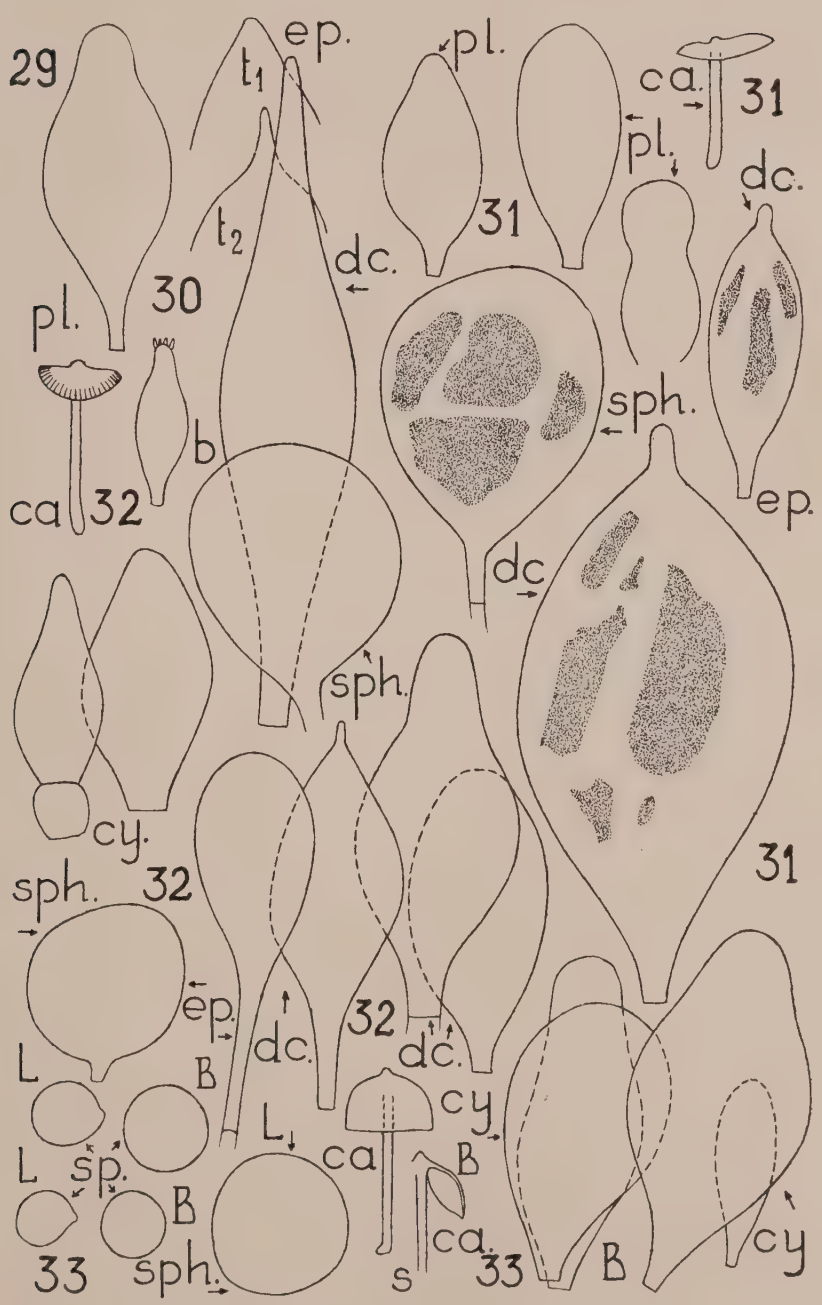


PLATE 14

22. *PLUTEUS AQUOSUS* Sing., Trans. Brit. Mycol. Soc. **39**: 148. 1956.,
—Fig. 14.

Pileus white to watery white minutely fibrillose on the disc, margin smooth to very short-sulcate, but a sordid pinkish shade appearing in the marginal zone eventually, convex subumbonate, eventually flatter, 20–40 mm. broad. Lamellae white, then pink with white to pinkish pallid edge, close to subclose, rather broad, free. Stipe white to watery whitish, white sericeous, hollow, tapering upwards but not bulbous, 40–50 x 5–6 mm. Context white or watery white unchanging, inodorous. Spores varying from very short ellipsoid to subglobose, but few if any globose, 5.3–6.8 x 4.7–5.7 μ . Hymenium: Basidia 4-spored; cystidia hyaline, entire, 48–63 x 10–26 μ , ampullaceous with a very broad “neck” or with subcapitate apex, rather numerous; cheilocystidia more versiform, sometimes with lobed crested apex, always broadly ventricose below, hyaline, 40–47 x 9–23.5 μ . Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of chains of elongated hyphae, most of them hyaline, some of them with pale fuscidulous evenly dissolved intracellular pigment, terminal members fusoid-ampullaceous, $8\frac{1}{2}$ –140 x 9–19 μ ; “neck” obtuse, about 4 μ in diameter.

On rotten dicotyledonous wood in subtropical-montane forest.

ARGENTINA: Prov. Tucumán, east slope of Taficillo at 1,100 m. altitude, 23-II-1955. Singer T 2208 (LIL, typus).

23. *PLUTEUS HAYWARDII* Sing., Trans. Brit. Mycol. Soc. **39**: 147. 1956.; l.c. fig. 2.

?*Pluteus alborubellus* “(Mont.)” Pat., Bull. Soc. Mycol. Fr. **15**: 196. 1899, sensu Pat. non *Agaricus alborubellus* Mont., Ann. Sc. Nat., 4^{me} sér., **1**: 96. 1854.

Pileus between white and *Arizona* (M&P 13-E-6) or *thrush* (M&P 14-C-7) or with some zones of *Manila* (M&P 12-C-5) and with concolorous center, or else, if the pileus is white, darkening in age to *flesh*, *blonde* (M&P 4-A-9) and umbo mostly pale ocher, the zones and the umbo, or else the entire pileus, with a fine and thin granular covering which in age remains visible only in the center, taking the shape of small fibrils, or else glabrescent even under a lens, generally where more glabrescent—less colored, with striate margin, or transparently striate and at the same time finely sulcate in mature caps over one to two thirds of the radius, neither viscid nor rugose, semiglobose or semiglobose-subumbonate, eventually more repand and then umbonate, sometimes with elliptical outline, 12–25 mm. broad and e. gr. 6.5 mm. high. Lamellae white, rather late becoming pale salmon colored, with white to pink edge, broad (to 3 mm.), free or remote-free. Stipe white, eventually becoming somewhat sordid melleous in some carpophores, or tending towards *Manila* (M&P 12-C-5) near the base, white pruinete, glabrescent, subequal or with slightly tapering apex and base, without a bulb, 23–27 x 1–1.5 mm. Context white, unchanging, soft, rapidly putrescent, fragile, inodorous. Spores 5.5–7.2 x 4.8–6.8 μ , varying between nearly geometrically globose and very short ellipsoid, smooth, stramineous-pallid. Hymenium: Basidia 7–9.3 μ broad, clavate, 4-spored, few 2-spored. Cystidia identical on edges and sides of lamellae, numerous on edges, also relatively numerous on sides, 38.5–48.5 x 17.5–21 μ , broadest below or in the middle, attenuated upwards and short-attenuate downwards, always broadly rounded at tip, hyaline.

Hyphae all without clamp connections; also some oleiferous hyphae present. Covering layer of pileus (granules or fibrils) formed by cystidioid elements which appear in fascicles and appressed, with intracellular dissolved pigment, brownish; cystidioid elements of the epicutis vesiculose, broadest in the middle or below and somewhat attenuate toward the tip with a broadly rounded tip, smooth, $(14.5)-37-55 \times (8.2)-13.7-29 \mu$, at times with a short-mucronate apex, rarely some elements small and vesiculose-clavate; underneath the cystidioid elements of the epicutis—a cutis (the hypodermium) formed by hyaline hyphae which are non-gelatinized and thin $(2.7-5.5 \mu)$.

On trunks of dicotyledonous trees and on fallen branches on the ground, in subtropical and montane-subtropical forest, fruiting in summer and fall.

ARGENTINA: Prov. Tucumán, Parque Aconquija, Singer T 452, 17-IV-1949, (LIL, typus). Anta Muerta, T 151, 23-II-1949 (LIL). ?GUADALUPE: Duss, on *Bignonia pentaphylla* (FH).

As I have pointed out before (Trans. Brit. Mycol. Soc. l.c. and p. 149) the identity of *P. alborubellus* sensu Pat. is not certain. It may be the preceding species. *Agaricus alborubellus* Mont. is not a *Pluteus* (see Trans. l.c.).

STIRPS SPILOPUS

We have already indicated the existence of a stirps consisting of *A. spilopus* and allied species. This is characterized by appressed long radial fibrils in the marginal zone and, at least potentially, erect sometimes almost spinulose fibrils in the center. Spores not globose. Stipe white with or without blackish or umber fibrils (never grey and silky). All species subtropical or tropical.

KEY TO THE SPECIES

- A. Pileus less than 3 mm. broad..... (see 37: *P. amazonicus*)
- A. Pileus more than 3 mm. broad.
 - B. Stipe white, macroscopically without darker fibrils.
 - C. Pileus ash grey to brownish cinereous, rimose; stipe pure white. Subtropical species on Urticaceae.....24. *P. rimosellus*
 - C. Pileus not so colored, not always rimose in adult specimens, usually not on Urticaceae in subtropical America.
 - D. Pileus fuliginous sepia, deep chestnut, chocolate; stipe $40-63 \times 3-7$ mm; pleurocystidia mostly subcapitate..... (see "F": *P. albstipitatus*)
 - D. Pileus fuliginous-fuscous, brown-sugar-color, or grey to bister; stipe $15-40 \times 2.5-3$ mm.; pleurocystidia hardly ever subcapitate..... (see "F": *P. cubensis*)
 - B. Stipe white to silvery cinereous, with darker (fuliginous to black) fibrils.
 - E. Most of the cheilocystidia clavate to vesiculose, or some attenuate at apex; stipe shorter or longer than diameter of pileus; fibrils of stipe not conspicuous, often difficult to observe macroscopically.
 - F. Pileus fuliginous sepia, deep chestnut, chocolate; stipe $40-63 \times 3-7$ mm.; pleurocystidia mostly subcapitate.....25. *P. albstipitatus*
 - F. Pileus fuliginous-fuscous, brown-sugar-color or grey to bister; stipe $15-40 \times 2.5-3$ mm.; pleurocystidia hardly ever subcapitate.....27. *P. cubensis*
 - E. Most cheilocystidia attenuated above, fewer vesiculose-clavate; stipe longer than diameter of pileus; fibrils of stipe conspicuous as in *Gomphidius maculatus* or *Melanoleuca verrucipes*. Subtropical species....26. *P. fastigiatus*

24. *PLUTEUS RIMOSELLUS* Sing. in Sing. & Digilio, Lilloa **25**: 262. 1951 (1952).—Trans. Brit. Mycol. Soc. **39**, fig. 30. 1956.

Pileus cinereous or brownish cinereous, squamulose-fibrillose-rimulose, with the flesh of the pileus becoming visible between the fibrils of the marginal zone, in the center appressedly cinereous-squamulose, or whitish-subsquamulose, in the marginal zone less squamulose, the fibrils more or less appressed, soon radially rimose as in many *Inocybes*, or in *Pluteus fastigiatus*, with somewhat sulcate margin, more plicate-sulcate in dry state, constantly and persistently convex or obliquely campanulate, not viscid, 10–35 mm. broad, sometimes up to 17 mm. high. Lamellae white with white edge, then pink with pink edge, close, broad, free or remote. Stipe pure white, at the apex subpruinose or subglabrous, otherwise glabrous, sometimes finely longitudinally striate, tapering upwards, 15–65 x 2–6 mm. Context white, unchanging, soft, inodorous. Spores 6.8–7.5 x 5.3–6.8 μ , subglobose to very short ellipsoid, smooth, stramineous-hyaline. Hymenium: Basidia clavate, 4-spored. Cheilocystidia 30–60 x 9.5–25 μ , vesiculose and gradually tapering from the broadest region upwards to form a very broadly rounded tip, or subglobose and pedicellate, hyaline, smooth. Pleurocystidia somewhat larger than the average of the cheilocystidia, ampullaceous, ventricose at the base and strongly attenuate toward the apex, sometimes mucronate and with subcapitate tip, hyaline or very pale fuscidulous-hyaline. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of fascicles which, in their turn are made up of elongated elements; these elements e. gr. 80 x 16–17–(19) μ , with dissolved intracellular brownish pigment, subfusoid with rounded tip.

On standing trunks of *Urera*, on dead wood, in subtropical forest, gregarious, sometimes up to 3 m. above ground, fruiting in summer and fall.

ARGENTINA: Prov. Tucumán. Río de los Sosas, R. Singer T 1089, 1-I-1951 (LIL, MICH, typus). Quebrada de Lules, R. Singer T 1544, 13-V-1951 (LIL, paratypus).

This differs from other rimose species in the color of the pileus, the sulcate margin, the white stipe, and the pleurocystidia which are very much differentiated from the cheilocystidia; also the habitat seems to be characteristic and constant.

25. *Pluteus allostipitatus* (Dennis) Sing. (ad int., Brit. Mycol. Soc. Trans. **39**: 184. 1956) ex Sing., comb. nov.;—l.c. fig. 34.

Pluteus spilopus var. *allostipitatus* Dennis, Bull. Soc. Mycol. Fr. **49**: 195. 1953; *ibid.*, pl. 4, fig. 3 (Dennis).

Pileus brown-fuscous to deep chestnut ("Verona brown" R. Mandalay, chocolate, M&P 8-H-10 to 8-L-12), disc often almost black (e. gr. *African* 8-E-8) appressedly and very densely radially fibrillose and velutinous to fibrillose-punctate in the center, marginal zone eventually subglabrescent and sometimes fatty-shining but not at all viscid, from margin over one eighth to one-third of radius sulcate, conic-campanulate at first, but soon expanding, becoming convex, then applanate with a low rounded or truncate umbo, 28–60 mm. broad. Lamellae white then pink with hyaline pink edges, narrow or broad

(4–7 mm.) close, free. Stipe white, finally becoming somewhat silvery-white to glassy-cinereous, pallid when dried, subglobose without darker fibrils or with very scattered ones which are fuliginous and strictly appressed, thin, macroscopically not prominent and tending to make the stipe appear pale cinereous, not black dotted or black striped, sometimes longitudinally sulcate, solid, sometimes compressed in lower portion, tapering upwards or almost subequal not bulbous, 40–63 x 3–7 mm. Context white, unchanging, sometimes sordid under the cuticle, inodorous. Spores often extraordinarily variable in size, and sometimes easily separable into three classes (small, normal, and gigantic, so in the type), 5.8–10.3 x 4.7–9 μ , subglobose to short ellipsoid, never globose, smooth, stramineous pinkish. Hymenium: Basidia 22–29.5 x 6.7–9.2 μ , ventricose-ampullaceous, 4-spored. Cheilocystidia 32–68 x 7.5–16.5 μ , mostly clavate to clavate-vesiculose, rarely clavate-subcapitate or vesiculose-ventricose, and hardly ever attenuate above into a mucro, exceptionally bifurcate, making the edge subheteromorphous or almost so, hyaline. Pleurocystidia 38–64 x 12–25 μ , capitulum 10–16.5 μ thick, neck 8–10 μ thick, similar to cheilocystidia or more often ventricose with a constriction above the broadest portion and a subcapitate (upper ventricose) apex, rarely ampullaceous, frequently tip truncate or with short obtuse or subacute small outgrowths, but just as frequently with entire apex, exceptionally with a pseudo-(secondary) septum near the tip. Hyphae without clamp connections. Context consisting of narrow hyphae with broad terminal members, all hyaline (approximation to *Amanita*-structure). Covering layer of pileus: Terminal members of hyphae of the epicutis elongated, 46–118 x (4)–12–19 μ , with evenly dissolved or locally condensed fuscous intracellular pigment, with broadly rounded tips, generally repent or ascendant to depressed, at least in marginal region.

On dead trunks of dicotyledonous trees in tropical rain forest and montane (tropical to subtropical) forests fruiting in summer and early fall.

TRINIDAD: River Estate, Diego Martín, Dennis no. 89, 29-IX-1949 (K, typus). BOLIVIA: Oriente (Dpto. Beni): Prov. Vaca Diez, Guayaramerín Singer B 2065 (LIL). 18-III-1956, B 2123 (LIL), 18-III-1956. ARGENTINA: Prov. Tucumán, Parque Aconquija, Singer T 2169, (LIL), 17-II-1955. Capital, Singer T 2322, (LIL), 23-III-1955.⁵

This species is very close to *P. spilopus* inasmuch as there are some collections where the presence of thin, scattered and inconspicuous fibrils on the surface of the stipe presents a transitional condition. On the other hand, the collections from Ceylon including those made later by Petch (K) show all very strong black dots or streaks. Furthermore, the characteristic variability of the spores is not very noticeable in the type of *P. spilopus*.

⁵Here the pleurocystidia were found to be vesiculose-ventricose and neither mucronate nor subcapitate, 50–58 x 17.8–18.8 μ . The epicuticular hyphae were frequently effilate with a narrow, obtuse hyaline small terminal member, the preceding member with evenly dissolved fuscous intracellular pigment. On dead palm. Similar pleurocystidia were also observed, aside from normal ones, in the type specimen from Trinidad. The epicutis structure is like the one we find in the type of *P. spilopus*.

26. *P. FASTIGIATUS* Sing. in Sing. & Digilio, Lilloa **25**: 259. 1951 (1952);—Trans. Brit. Mycol. Soc. **39**, fig. 12. 1956.

Pileus blackish fuscous or umber-fuliginous, fibrillose-dissolving outside of disc and early rimose, finely appressedly squamulose on disc or almost all over, white in the crevasses between fibers, the latter appressed, often reticulating margin not sulcate, convex with a truncate or rounded umbo around which the pileus may be slightly depressed, 27–43–(60) mm. broad. Lamellae pink with white or pink edge, broad or rather broad, ventricose or subventricose, close, free. Stipe with longitudinal appressed fuliginous to black fibrils all over, tapering upwards or subequal, rarely slightly bulbous, 60–88 x 5–10 mm. Context white, unchanging, inodorous. Spores 6.5–7.3 x 5–6.5 μ , in some carpophores also macrospores present which measure 9–11 x 7–8.5 μ (but only if absidia with less than 4 sterigmata are present), smooth, short-ellipsoid to subglobose, never globose, stramineous. Hymenium: Basidia 21.5–37 x 6.8–10.3 μ , clavate or ventricose, either all 4-spored, or with 1–2–3-spored ones intermixed. Cheilocystidia 21.5–80 x 11.3–30 μ , vesiculose-subampullaceous, more rarely ventricose-ampullaceous, or ampullaceous, or vesiculose-clavate to vesiculose-submucronate, hyaline. Pleurocystidia almost exclusively ventricose-ampullaceous (ventricosity in the middle or slightly below) to ampullaceous-subcapitate, and mostly pedicellate, sometimes with spiral bodies inside but always hyaline, with thin to moderately thickened wall without incrustation, without prongs or merely with nodose or small spinulose excrescences at apex, not metuloid, 51.5–86 x 13–30 μ , capitulum up to 11 μ in diameter (where present), wall up to 0.8 μ thick, hyaline. Hyphae without clamp connections, hyaline in trama. Covering layer of pileus: Epicutis consisting of chains of strongly elongated hyphae, the terminal members often free and ascendant or applicate, broadest near last septum or in lower third, attenuate in upper third, filled evenly with dissolved brown intracellular pigment, with broadly rounded tips, in the umbo region more palisadic with the terminal cell somewhat cystidioid and the lower cells short and taking the form of a subhymenium (hypodermium); terminal cells in either case 43–117 x 8–4.3 μ .

On dead wood and on earth in subtropical forest, fruiting in summer.

ARGENTINA: Prov. Tucumán: Santa Rosa, Singer T 1054, 17–XII–1950 (LIL, MICH, typus). Rio de los Sosas, 1000 m. alt., Singer T 2129, 4–II–1955. (LIL).

This species differs from *P. spilopus*—which is very close—in having a comparatively long stipe and predominantly apically attenuated cheilocystidia. *P. fastigiatus* is also close to *P. albestipitatus* from which it differs in the strongly blackish fibrillose stipe and the shape of the cheilocystidia. The notion of a geographical race or a mycoecotype is not justified in view of the overlapping (in one case) or separation (in the other) of areas and the ubiquitous character of the American species.

27. *PLUTEUS CUBENSIS* (Murr.) Dennis, Bull. Soc. Mycol. Fr. **49**: 155. 1953;—*ibid.* pl. 4, fig. 10 (Dennis).

Nolanea cubensis Murr., Mycologia **3**:275. 1911.

Pileus *biskra* (M&P 16-A-12) in the center and *brown sugar* (M&P 15-H-10) on the margin, also "bister" (R. fide Dennis), often with nearly white margin since the coloring is due to fine silky fibrils which are dense on the disc and become frequently very scattered towards the margin, the fibrils at first when quite fresh somewhat squarrose but on drying applicate, and forming granular or finely fibrillose punctations towards the margin splitting in an *Inocybe* fashion along the depressions of the sulcate margin and therefore appearing rimose, with the white flesh showing through when well pigmented, merely sulcate in the manner of *Russula puiggarii* when not well-pigmented, slightly hygrophanous if the fibrils are not dense, and especially when old, campanulate to convex with steeper marginal region, eventually applanate, but mostly slightly umbonate, 17–38 mm. broad. Lamellae white then pink, edge always concolorous with sides, subclose or close moderately to rather broad, somewhat ventricose in many caps, free. Stipe white, often seen longitudinally striate in mature specimens, very finely (lens) fibrillose, more distinctly fibrillose and somewhat concolorous with the center of the pileus at the base, solid, subequal with slightly thickened base or slightly tapering upwards, the brown-fuliginous fibrils of base so indistinct that they can be distinguished only with a lens, always microscopically with pure white mycelial felt at base, 15–40 x 2.5–3 mm. Context white, inodorous. Spores 6.2–8.8 x 4.5–7.3 μ , subglobose, smooth, stramineous. Hymenium: 22.3–24.3 x 7.2–9 μ , clavate, 4-spored. Cheilocystidia as pleurocystidia but more variable, especially tending to be more vesiculose, all hyaline, numerous; pleurocystidia (30)–41–73 x (11)–13–20–(33) μ elongate-ventricose, ampullaceous, often somewhat granular-incrusted at the apex, hyaline, thin-walled, with entire apex, rarely with nodulose excrescencies. Hyphae without clamp connections. Covering layers: Epicutis of pileus with elongate elements which are completely and evenly filled with the brown dissolved pigment, the terminal ones often cylindrical, clavate or ampullaceous, always with broadly rounded tip; in the poorly pigmented forms similar elements are also encountered without pigment; dermatocystidia of the stipe versiform (shape of the cheilocystidia), hyaline in upper portion of stipe, more frequently filled with brown sap in the lower portion of the stipe.

On thin boards, on bamboo, on very rotten frondose wood, and on humus, fruiting during the rainy season from West Indies to Argentina, from montane-subtropical woods to subtropical or tropical forests and plantations.

CUBA: Santiago de las Vegas, Murrill 1955, (NY, typus. TRINIDAD: (K, v.i., LIL). ARGENTINA: Prov. Tucumán, Parque Aconquija, Singer T 204, 12–III–1949 (LIL). T 352, 1–IV–1949 (LIL). Ciudad Universitaria, Sierra de San Javier, Singer T 2019, 15–I–1955 (LIL). Rio de los Sosas, Singer T 2123, 4–II–1955 (LIL). Tafi del Valle, Quebradita, 2100 m. alt., Singer T 882, 15–I–1950 (LIL). Quebrada La Higuera, Singer T 2093, 25–I–1955 (LIL). Prov. Salta, Cafayate, San Isidro, at 1650 m. alt., K. Hayward T 2540, comm. Singer, 21–I–1955 (LIL).

In spite of the great variability of the surface of the pileus this species seems to belong to the same stirps as *P. spilopus* and allied forms and some forms are extremely close to *P. albositipitatus*. However, in addition to the morphological characters indicated in the key, this latter species also differs in growing on humus, thin boards of very rotten wood, on bamboo débris rather than on trunks of palms and dicotyledonous trees. The two species cannot be geographic races since their area is for the most part coinciding. I do not believe that *P. cubensis* is merely a form adapted to plantations etc. since in the Tucumán region it can at times be found in plain subtropical forest although, in that case, on rotten dicotyledonous wood and here (T 2123) as in similar dark (*owl*, M&P) forms elsewhere, the rimosity of the pileus is hardly visible and the cystidia tend to be relatively shorter and less ampullaceous and the spores slightly smaller than average. This combination of characters (as in Argentine material, T 2123, LIL) has nothing to do with the age of the carpophores. The fibrils are in this case more pustulose-squarrose, although very small. In this collection, the center of the pileus is *Owl*, margin *Santos* (M&P). I am not certain whether this is an extreme form of *P. cubensis*, or a closely related, autonomous form.

STIRPS DIPTYCHOCYSTIS

The stirps is close to the preceding because of surface characters of the pileus but differs in the characters of the cystidia. Besides, a temperate species, it is the only representative known at present, while in the preceding stirps, temperate species are not known.

28. *PLUTEUS DIPTYCHOCYSTIS* Sing., Sydowia **8**: 124. 1954;—Trans. Brit. Mycol. Soc. **39**, fig. 11. 1956.

Pileus fuliginous to deep fuscous, eventually paler in marginal zone, at first tomentose to tomentose-fibrillose-subsquamulose, soon fibrillose-squamulose either all over or only in the center, the marginal zone becoming radially fibrillose and tending to split slightly and sometimes rimose or lacerate, margin not sulcate, at times becoming naked (the cuticle retracted), and tending to be short-sulcate, at first broadly conical then convex to subapplanate, umbonate, more rarely umbilicate or subumbonate, 36–68 mm. broad. Lamellae white, then pink with white to pink edge, broad (5.5–8 mm. broad), close, free. Stipe watery cinereous when wet, cinereous-white when dry, longitudinally silky-striped and shining when dry, solid, slightly tapering up or equal above a slight bulb, more rarely without basal thickening, 38–80 x 5–11 mm. Context white in pileus, watery gray in stipe, when dry (not dried) grayish white in stipe, unchanging otherwise, but sometimes (rarely) in wet condition gray all through (including pileus). Odor none. Spores 6.8–9.6 x 5.3–7 μ , ellipsoid to subglobose, never globose, smooth, pinkish stramineous. Hymenium: Basidia 20–29 x 5.3–7 μ , 4-spored. Cheilocystidia and pleurocystidia similar, 24–97 x 22–32 μ , ampullaceous with broad neck (neck e. gr. 7.5 μ thick), near and on edge also sometimes more vesiculose-ventricose and shorter, numerous on both edge and sides of the lamellae, in 5% KOH very characteristically thin-walled or almost so but with a free outer wall

in the upper half or third, this outer wall mostly loose and smooth, further below either disappearing or so intimately applicate to the main wall that it becomes indistinct, also sometimes broken and fragmentary below, hyaline. Hyphae of the trama of the pileus often strongly irregularly swollen, those as well as the connective hyphae constantly without clamp connections. Covering layer of pileus: Epicutis formed by appressed hyphae which form what appears to be a cutis, hyphae long, terminal members up to $14\ \mu$ thick, fusiform with rounded tips, pigment intracellular, rarely also membranal, deep fuscous.

On decayed branches and bark as well as on woody humus and forest detritus in pure myrtaceous forest, singly but in large colonies, fruiting in late fall.

ARGENTINA: Patagonia: Parque Nacional Nahuel Huapi, Isla Victoria, Singer M 725, 17-V-1952, (LIL, MICH, typus).

STIRPS ATRIAVELLANEUS

Pileus very little fibrillose in the middle, margin striate to sulcate, glabrous and often more or less hygrophanous. Mostly temperate and subtropical forms.

KEY TO THE SPECIES

- A. Pileus campanulate-ovoid, shallowly umbilicate, with tiny brownish flocons especially in center, winter-fruiting.....31. *P. hiemalis*
- A. Pileus convex, not umbilicate, fruiting in summer and fall.
 - B. Spores all more than $6.5\ \mu$ broad. Pileus appressedly fibrillose, usually relatively large. Cystidia broad, more or less vesiculose, and often thrice narrowed above (doubly ampullaceous). On *Alnus* wood....29. *P. sulcatus*
 - B. Spores less than $6.5\ \mu$ broad (rarely some giant spores up to $8.7\ \mu$ broad). Not on *Alnus* wood.
 - C. Pileus 10 mm. broad or broader; stipe 22 mm. long or longer.
 - D. Species of the Northern Hemisphere. (see 30. *P. atriavellaneus*)
 - D. Species of the Southern Hemisphere (see key to stirps *Nitens*).
 - C. Pileus smaller; stipe shorter.
 - E. Pileus about 9 mm. broad; stipe about 15×1 mm.....30. *P. atriavellaneus* var. *parvus*
 - E. Pileus about 2.5 mm. broad; stipe about $4\text{--}4.5 \times 0.3$ mm.....(see 38. *P. amazonicus*)

29. *PLUTEUS SULCATUS* Sing. in Sing. & Digilio, Lilloa **25**: 265. 1951.

Pileus fuscous-brownish fibrillose, with strictly appressed fibrils, on margin more or less glabrous, not venose, not viscid, short but distinctly (over the marginal 2–10 mm.) sulcate, almost pectinate-plicate here and there and sometimes almost smooth in parts of the marginal zone, convex, subumbonate 25–51 mm. broad. Lamellae pink with pink edge, which is fimbriate, moderately broad, or broad, free. Stipe white, with white flocons especially in the lower portion, slightly longitudinally sulcate, subequal, $35\text{--}56 \times 2.5\text{--}6$ mm. Context white, inodorous. Spores $7.5\text{--}9 \times 7\text{--}8.2\ \mu$ (up to $1\ \mu$ longer than broad), subglobose, smooth, flesh-straw-color. Hymenium: Basidia $25\text{--}27 \times 10.2\ \mu$, clavate, 4-spored. Cystidia numerous at edge, less numerous on sides, otherwise similar, $46\text{--}112 \times 22\text{--}33\ \mu$, mostly vesiculose- to vesiculose-ventricose in the lower portion and ampullaceous attenuate in the upper, or attenuate-capitate, or twice ampullaceously narrowed (doubly ampullaceous), always entire, neither horned nor nodulose,

hyaline. Hyphae: all without clamp connections. Covering layer of pileus: Epicutis consisting of hyaline or melleous (usually both) elongated appressed elements which are somewhat irregular (not strictly cystidiform) and smooth.

On the trunk of *Alnus jorullensis* var. *spachii* in montane woods.

ARGENTINA: Prov. Tucumán, Tafí del Valle, Quebradita, 2100 m. alt., Singer T 876, 15-I-1950 (LIL, typus; MICH, holotypus).

30. PLUTEUS ATRIAVELLANEUS Murr., North Am. Flora **10**: 131. 1917.

Var. ATRIAVELLANEUS. (Bull. Soc. Myc. Fr. **69**, pl. 4, fig. 4, 1953.)

Pileus "Buffy Brown" and "Chaetura Drab" (R.) or *Wigwam* (M&P) but reaching (sec. Dennis) "Fuscos Black" and "Light Neutral Gray" (R.), weakly or strongly hygrophanous, in the lighter coloured forms becoming whitish cinerous or sordid greyish pallid when dry, glabrous or slightly fibrillose or silky on disc, rarely with loose tiny sericeous flocons of a white, very fragmentary and extremely fugacious general veil, with short-transparently striate to striate-sulcate or sometimes distinctly sulcate margin, disc smooth convex, eventually convex-applanate, with or without an obtuse umbo, 10-41 mm. broad. Lamellae white, then pink, ventricose broad to very broad, subclose to crowded, free; edge pink. Stipe entirely white but often longitudinally hyaline-striped when wet, or pallid, sometimes light grey near the base, glabrous, only at base slightly fibrillose at times, and at apex slightly pruinose when young, solid, soon becoming narrowly hollow, equal or tapering upward, often with a very slightly thickened base, 22-60 x 1-6 mm.; veil inconstant and extremely evanescent; basal tomentum white. Context white, thin in pileus, unchanging, inodorous. Spores (6) 6.5-8.2 x 5.2-6.7 μ , short ellipsoid to subglobose. Hymenium: Basidia 20.5-33 x 7.8-9.8 μ , 4-spored; cystidia hyaline vesiculose to ventricose below, usually rounded but frequently with a short neck or mucro at the apex, more rarely with a rather thick neck or without neck and merely attenuate above, little or not resinously incrustated, 24-82 x 7.8-27.5 μ ; cheilocystidia similar but sometimes vesiculose or ampullaceous to fusoid, generally more variable, rarely with slightly nodulose apex, all hyaline. Hyphae without clamp connections; hymenophoral trama inverse. Covering layer of pileus: Epicutis of repent hyphae with the terminal cell always or in most cases rounded at the apex, rarely with acute mucro, strictly elongated but variable in shape, cylindrical, clavate, subulate (but obtuse), hyaline or with fuscous sap, 8-18.5 μ broad, 30-150 μ long.

EXPLANATION OF PLATE 15

PLATE 15. FIG. 34. *P. chrysophebius* ssp. *bruchii* (B=var. *bruchii* and A=var. *aconquijensis*) and ssp. *sublaevigatus* (S), the numbers referring to material studied, ca=carpophores (d=from dried type material, s=from Spegazzini's drawing from fresh type material), x 0.9; sp=spores, x 1.800; ch=cheilocystidia, x 900; pl=pleurocystidia, x 900. FIG. 35. *P. globiger* (numbers referring to material studied), ca=carpophores, x 0.9; cy=cystidia, x 900. FIG. 36. *P. xanthopus*, ca=carpophore, x 0.9; ch=cheilocystidia, x 900; ep=elements of epicutis of pileus (sph=spherocyst), x 900; pl=pleurocystidium, x 900.

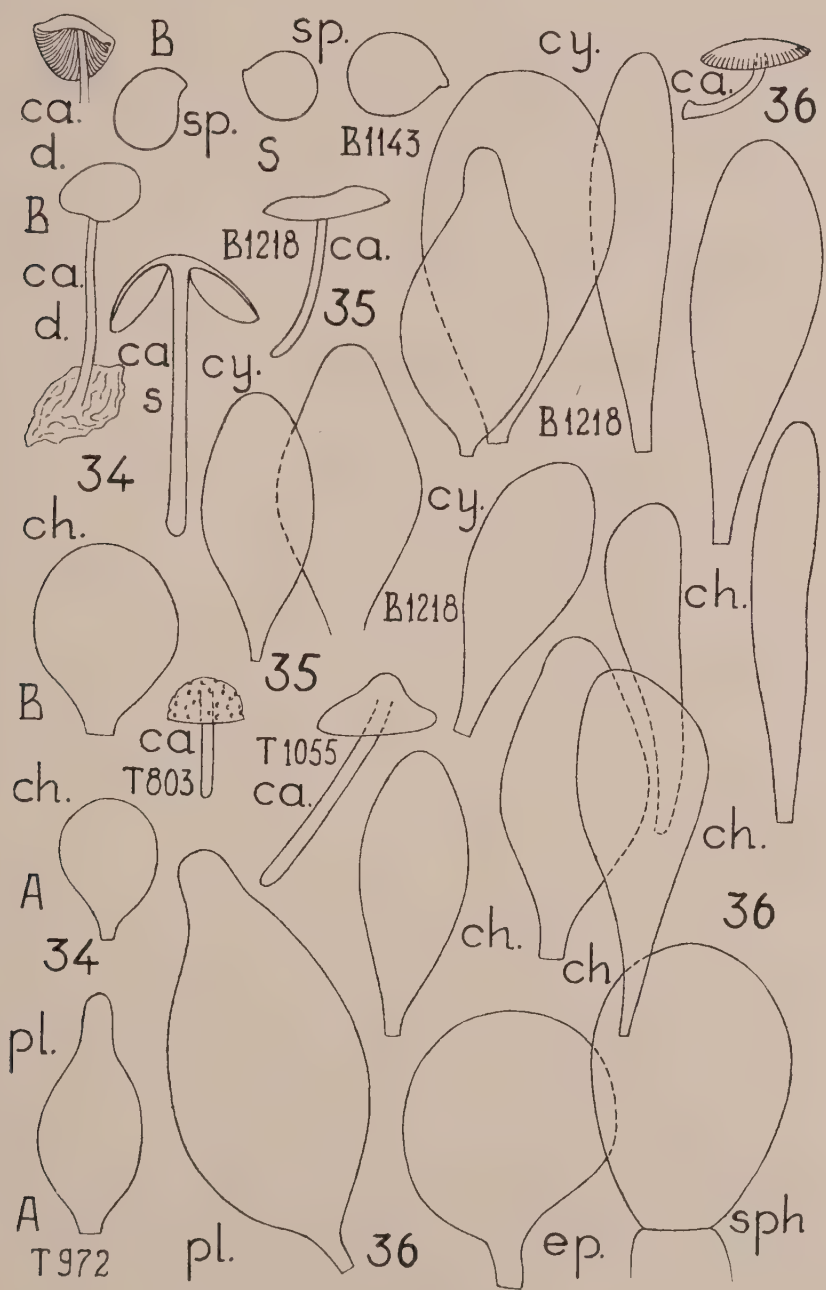


PLATE 15

On very decayed logs and woody debris of angiosperms, fruiting from June until December; widely distributed.

U.S.A.: Mich., Douglas Lake, Singer N 54, 75, 327 (F) and T 2101 (LIL); Tenn. (type); Fla., Matheson Hammock, Dade Co., Singer F 1409 (F); Trinidad, W. I., Dennis 75, 75a (K), as *P. fuliginosus*.

Var. **parvus** Sing. Trans. Brit. Mycol. Soc. **39**: 151. 1956 ex Sing. var. nov.;—Fig. 15.

Carpophoris minoribus; ad lignum Podocarpi, Argentina.

Pileus *Olive Wood* in centre, *English Oak* (M&P) on margin, the latter through three-quarters of the diameter of the pileus transparently striate, and sulcate when dried, convex, 9 mm. broad. Lamellae pink, broad, ventricose, subclose, free. Stipe sordid hyaline, glabrous above, subpruinose below, thickened at the base, 15 x 1–2 mm. Spores 6.5–7.6 x 4.8–5.8 μ , not globose. Hymenium: cystidia vesiculose to ampullaceous, with a short strongly attenuate apiculus, or with a tapering subulate mucro or “neck” at the apex, hyaline, 45–55 x 8–12.5 μ , cheilocystidia similar. Hyphae of the thin-membranous white mycelial pad at the base of the stipe hyaline, bunched together and without clamp connections. Covering layer of pileus consisting of mostly repent filamentous hyphae, some rather broad towards the terminal end, most of them filled with a gelatinous brownish pigment, with broadly rounded tips.

On dead wood of *Podocarpus parlatoresi* (coniferous wood).

ARGENTINA: Prov. Tucumán, Sierra de San Javier, Taficillo, at 1900 m. alt., R. Singer T 1389, 4–III–1951, (LIL, typus).

Among the two collections by Dennis, one, the dark colored one, might be different from *P. atriavellaneus* var. *atriavellaneus*, and may actually belong to *P. cubensis* (darker forms such as my T 2123). Since this specimen from Trinidad has not been recently revised by me, I leave the question open. It does not change anything in this treatment, regardless where it eventually belongs.

31. **Pluteus hiemalis** Sing., spec. nov.,—Fig. 16.

Pileo pallido, brunneolo-flocculoso, sulcato, campanulato ovoideo, dein campanulato-convexo, exumbonato, umbilicato, 11–23 mm. lato. Stipite albo vel brunneolo-albo. Sporis 5–7.2 x 4–6.2 μ . Cystidiis hyalinis, ventricose-subampullaceis, late rotundato-obtusis; membris terminalibus epicutis (in flocculis pilei) erectis vel semiascendentibus, apice late rotundato-obtusis. Hyphis defibulatis. Ad truncos.

Pileus minutely brownish flocculose on pallid ground, flocculi very small, denser in center, very scattered on marginal region and there surface appearing almost purely pallid and somewhat fibrillose, densely sulcate over the margin (zone 3–5 mm. broad), not rimose, campanulate ovoid when young, later campanulate-convex, 11–23 mm. broad, 11–12 mm. high. Lamellae pink with pallid edge, moderately broad to broad (4 mm.), with entire edge, close, free. Stipe white to brownish white, finely fibrillose, slightly longitudinally striate, solid, tapering upwards, 18–23 x 4–5.5 mm. Context white, unchanging, fleshy, without any odor or with a slight raphanaceous one. Spores 5–7.2 x 4–6.2 μ , subglobose to short-ellipsoid, smooth stramineous. Hymenium: Basidia

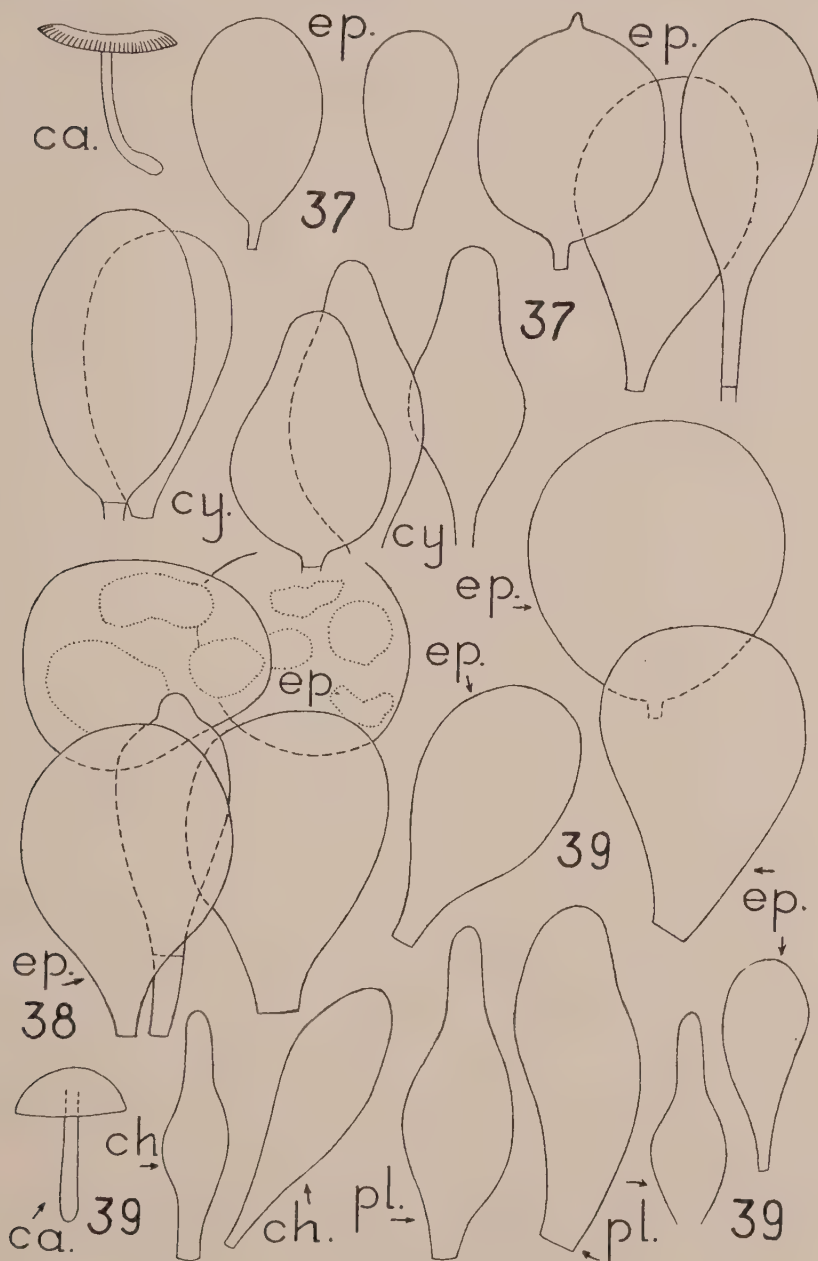


PLATE 16. FIG. 37. *P. beniensis*, ca=carpophore, x 0.9; ep=elements of epicutis of pileus, x 900; cy=cystidia, x 900. FIG. 38. *P. riograndensis*, ep=elements of epicutis of pileus, x 900; ca=carpophore, x 0.9. FIG. 39. *P. hololeucus*, ch=cheilocystidia, x 900; pl=pleurocystidia, x 900; ep=elements of epicutis of pileus, x 900.

4-spored. Cheilocystidia more versiform than the pleurocystidia and more crowded (edge almost subheteromorphous), ventricose-fusoid to ventricose-ampullaceous with thick neck which is attenuate to a broadly rounded tip, often long-pedicellate, but also clavate, $40\text{--}54 \times 8\text{--}22 \mu$, often filled with a protoplasmatic or fatty finely dispersed hyaline content. Pleurocystidia like cheilocystidia (but never clavate), also filled with a finely dispersed subgranular content which turns deep blue, deep lilac or pale bluish in cresyl blue mounts (very variable), the wall remaining hyaline, numerous, same size as cheilocystidia. Hyphae without clamp connections. Trama hyaline. Covering layer of pileus consisting of a cutis of repent filamentous hyphae; from there (where the brownish dots are) ascending to erect bunches of terminal members of hyphal chains, these filamentous or somewhat broader in the middle, somewhat ventricose, and always broadly rounded at tip, all filled with a brownish sap, pigment evenly dissolved.

On rotten log in subtropical forest, fruiting in September.

ARGENTINA: Prov. Tucumán, Río Cochuna. Marta Grassi, Singer T 2838 29-IX-1956 (LIL, typus).

STIRPS CINEREUS

This stirps is characterized by the sordid pallid to cinerous stipe and the rugulose center or rugose-venose pileus. Aside from *P. cinereus* and *P. cinerellus*, one South American species belongs here:

32. *Pluteus rugososulcatus* Sing., spec. nov.,—Fig. 17.

Pileo atrobrunneo, subviscidulo fere, breviter sulcato ad marginem, centro fortiter rugoso, convexo centro depresso, 25 mm. cc. lato. Lamellis albis dein rosascentibus subnigrescentibusque, crassiusculis. Stipite carneque sordide albidulis. Sporis $6.2\text{--}9.5 \times 5\text{--}8.8 \mu$; cystidiis ad aciem lateraque lamellarum hyalinis; hyphis epicutis pilei obtuse rotundatis vel rarissime acuminatis; hyphis omnibus defibulatis. Ad lignum putridum.

Pileus deep brown (*cattail*, M&P 8-H-12), very slightly subviscid in very wet weather, with short (3.5 mm.) sulcate margin, strongly rugose in the center and smooth between sulcate margin and rugose disc, convex, with depressed center, around 25 mm. broad. Lamellae white, becoming pink, eventually or simultaneously somewhat blackening, thick, broad, moderately close to subdistant, (perhaps indistinctly collariate-) free. Stipe sordid whitish, glabrous or subglabrous, tapering upward, 40×3.5 mm. Context sordid whitish, inodorous. Spores $6.2\text{--}9.5 \times 5\text{--}8.8 \mu$, mostly about $7.5\text{--}8.2 \times 6\text{--}6.5 \mu$, short ellipsoid

EXPLANATION OF PLATE 17

PLATE 17. FIG. 40. *P. eliae*, numbers referring to material studied, ca=carpophores, $\times 0.9$; epi=elements of epicutis of pileus, $\times 900$; sp=spores, $\times 1.800$; ch=cheilocystidia, $\times 900$. FIG. 41. *P. sapiicola*, ca=carpophores, $\times 0.9$; ch=cheilocystidia, $\times 900$. FIG. 42. *P. fluminensis*, material from the state of Rio de Janeiro (R) and the Yungas (Y), ca=carpophore, $\times 0.9$; cy=cystidia, $\times 900$. FIG. 43. *P. jamaicensis*, (number referring to material studied), ca=carpophore, $\times 0.9$; sp=spore, $\times 1.800$.

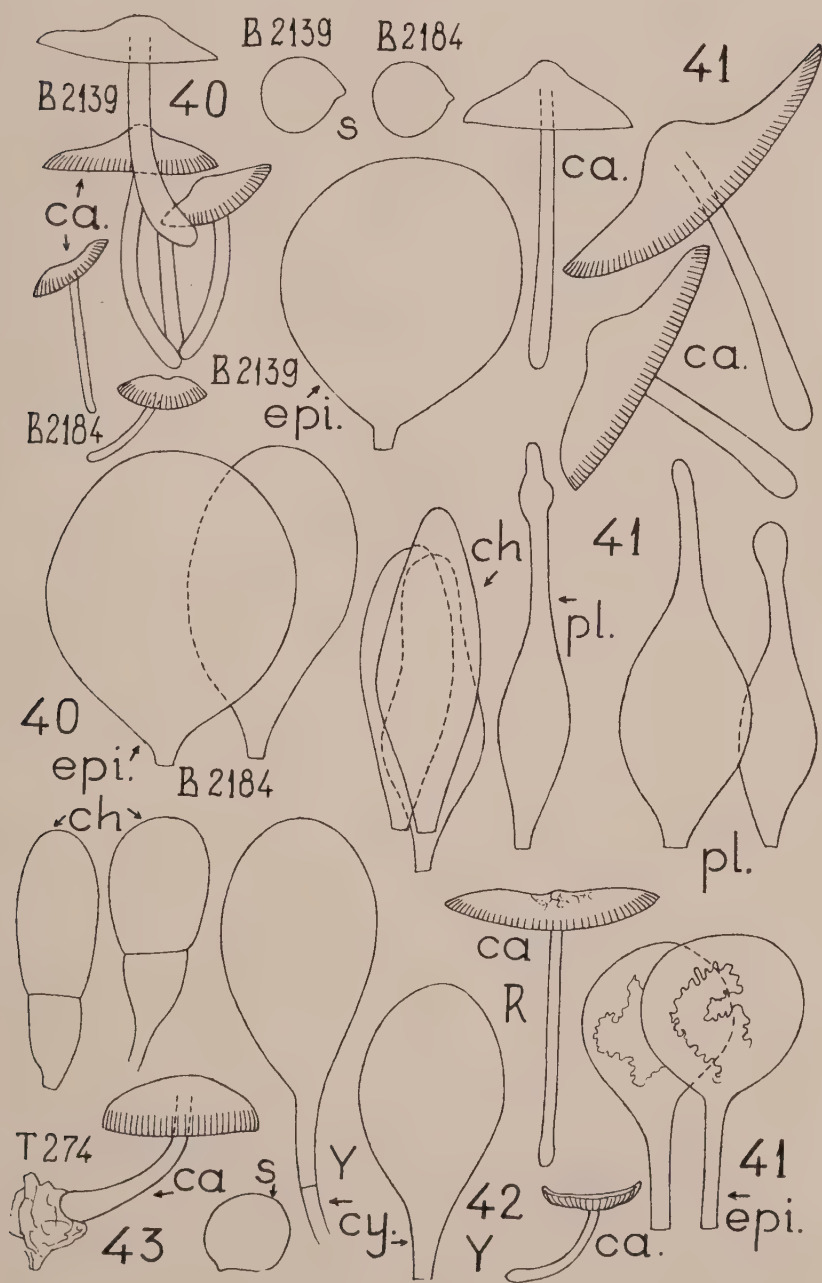


PLATE 17

to subglobose, not globose, smooth, stramineous. Hymenium: Basidia $24.5\text{--}30.2 \times 9.3\text{--}10 \mu$, ventricose, 4-spored. Cheilocystidia $35\text{--}44 \times 9.7\text{--}10.7 \mu$, clavate-ventricose (ventricose with broadest portion in upper third), with or without a very narrow and short apiculus at the very tip, hyaline. Cystidia on the sides of the lamellae $24\text{--}43 \times 13.5\text{--}17 \mu$, clavate to vesiculose or ventricose with or without a subcapitate apex, or if immersed in liquid medium, hyaline all over externally and internally. Hyphae without clamp connections, hyaline in the Trama. Covering layer of pileus: Epicutis consisting of very long repent hyphae, their terminal members at least 95μ long, $6\text{--}19 \mu$ broad, slightly ventricose or more rarely subcylindric, with broadly rounded tips, very rarely attenuate-subacute (pencil-like).

On rotten wood in mountain tropical woods, fruiting in the rainy season.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Cataratas de San Juan at 2,500 m. alt., Singer B 609, 28-I-1956. (LIL, typus).

The thin apiculus in some of the cheilocystidia, the sordid stipe and flesh, the rugose center, all show clearly that this species is a member of the *Cinereus* stirps. Among the South American species, it is most easily recognizable by its rugose center but may macroscopically be confused with species of the section *Mixtinus* and *Celluloderma*. Among the species of this stirps, *P. rugosulcatus* differs in having pleurocystidia, but, at the same time, having larger spores than the cystidiate *P. cinerellus* from Florida.

Among the species of the preceding stirps, *P. atriavellaneus* appears to be closest. This species has likewise numerous pleurocystidia and differs from the cystidiate representatives of stirps *Cinereus* in being completely devoid of veins or rugosities.

STIRPS UNAKENSIS

This stirps is characterised by the extraordinary (for *Pluteus*) spores which are ellipsoid and very small, their breadth being mostly below 4.2μ . These are small fibrillose or silky species, only the North American representative having been personally studied by this author. In South America there appears to be a representative of the stirps, at least judging by the description and illustration given by Dennis.

33. PLUTEUS MICROSPORUS (Dennis) Sing., Trans. Brit. Mycol. Soc. **39**: 170. 1956;—ibid. pl. 4, fig. 2.

Pluteus hispidulus var. *microsporus* Dennis, Bull. Soc. Mycol. Fr. **49**: 195. 1953.

Pileus "vinaceous buff" R., with black umbo, gray-fibrillose-pilose, repand, umbonate, 26–28 mm. broad. Lamellae pink, ventricose, 2 mm. broad, close, free. Stipe white, glabrous, fistulose, equal, 40 x 2.5 mm. Context white, very thin. Spores $5.5 \times 3.5\text{--}4 \mu$, ellipsoid, containing a large droplet. Hymenium: Cheilocystidia $36 \times 14 \mu$, ventricose-claviform thin-walled, hyaline. Covering layer of pileus: Hairs of the pileus surface consisting of 3–6 articles, gradually attenuate to a very thin tip, $19\text{--}22 \mu$ diam.: elements below these hairs filled with a brownish gray cell sap, uppermost cells hyaline.

On a felled tree trunk.

TRINIDAD: River Estate, Diego Martín, Dennis no. 15, 22-IX-1949 (K, typus, not seen).

The preceding description is adapted from the description and figures published by Dennis since I unfortunately neglected to study the type at Kew.

A personal analysis of the *P. hispidulus* of Europe (specimen collected by Bresadola) as well as the data published by Kühner & Romagnesi on the former's interpretation of that European species, show that *P. microsporus* and *P. hispidulus* are not sufficiently related to be subordinated under a single specific epithet.

STIRPS NITENS

Under this name, I combine a number of species which differ from the preceding species in having, among the spores of a print or those mature spores found on the lamellae of an old dried specimen, always some (from a small percentage to nearly all) practically geometrically globose spores. This may actually be an accumulation of several stirpes with moderately related species, but for practical reasons we think it preferable, at least for our present purposes, to maintain them all in one stirps.

Those species which are often found with a small percentage of truly globose spores are cross-keyed in the corresponding related stirpes.

KEY TO THE SPECIES

- A. Pileus long transparently striate in the marginal region. South American rain forests.....33. *P. sergii*
- A. Pileus not long transparently striate but rather short-sulcate or non-striate and non-sulcate.
 - B. Brown pigment bodies scattered in hymenium, especially near edge; pileus sulcate.....(see *P. eupigmentatus*)
 - B. Not so: Hymenium elements all hyaline; pileus fibrillose-rimose or just radially fibrillose.
 - C. Stipe without umber colored longitudinal superficial fibrils.
 - D. Pileus *conga* (M & P), more than 30 mm. broad, margin not sulcate or sulcate only because of rimosity. Amazonas region
34. *P. riberaltensis* var. *riberaltensis*
 - D. Pileus café au lait to olive brown; margin short sulcate, not reaching 30 mm. Mexico (and south?).....35. *P. nilens*
 - C. Stipe with innate umber longitudinal superficial fibrils.....
34a. *P. riberaltensis* var. *conquistensis*

33. *Pluteus sergii* Sing., spec. nov.,—Fig. 18.

Pileo fuligineo, longe pellucide striato, 20–21 mm. lato. Stipite albo, ad basin griseo. Sporis globosis 5.5–7.5–(9) x 5.3–7–(7.5) μ . Cheilocystidiis e fragmentis incrustationis resinaceae ornamentatis; pleurocystidiis praesentibus, hyalinis. Cellulis epicuticularibus rotundato-obtusis, pigmento in filamenta tenuissima spiraliformiter convoluta condensato, intracellulari. Hyphis omnibus defibulatis. Ad lignum monoctyledoneum in silva pluviali.

Pileus fuligineous, marginal two-thirds paler (*teakwood* M&P 15-C-9) because of the joint effect of fuligineous striae on much paler ground (transparently striate over two-thirds to one-half of the radius), smooth or subsmooth, subglabrous or glabrous, circular, convex then applanate, with a diameter smaller (20–21 mm.) than the length

of the stipe. Lamellae pink with pink edge, close, broad, free. Stipe white with gray base, subglabrous, very slightly tapering upwards, 45 x 2-3 mm.; mycelial tomentum white. Context white, unchanging,

thin, inodorous. Spores $\frac{5.5-5.7-6-6.9-6.8-7.7-7.1-7.5-9}{5.3-5.7-5.5-6.9-6.5-6.2-6.9-7-7.5} \mu$,

i.e. 5.5-7.5-(9) x 5.3-7-(7.5) μ , varying from subglobose to almost geometrically globose, the subglobose spores more numerous, smooth, stramineous. Hymenium: Basidia 15-20.8-(26.8) x 7.5-9.7 μ ventricose, 4-spored. Cheilocystidia 41-51 x 6.8-11 μ , numerous, making the edge subheteromorphous, ventricose-clavate, rarely ventricose-ampullaceous or with one or two apical horns, characteristically double-walled (and seemingly thick-walled and coscinoid) with the outer wall being merely a resinous and strictly applicate (not loosening) incrustation which is less elastic than the wall proper and therefore breaks into fragments of variable shape and size, which may or not continue to adhere to the

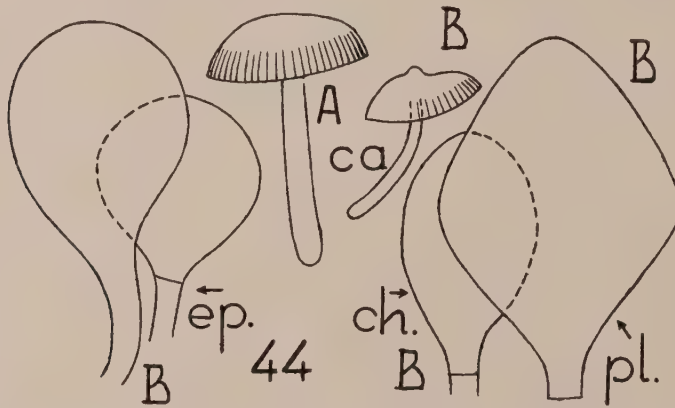


PLATE 18. FIG. 44. *P. fallax* from Brazil (B) and Argentina (A), ep=elements of epicutis of pileus, x 900; ca=carpophores, x 0.9; ch=cheilocystidium, x 900; pl=pleurocystidium, x 900.

surface of the wall proper, conspicuously opaque and non-transparent in NH_4OH mounts, well colored throughout inside by phloxine- NH_4OH . Pleurocystidia rather numerous but often tending to collapse, thin-walled with some resinous melleous-hyaline incrustation which may separate itself from the wall proper but then usually leaving the cystidium collapsed (dried material revived in NH_4OH), usually vesiculose-clavate, about 34 x 16.5 μ , or of the shape of the cheilocystidia, hyaline; metuloids none. Hyphae without clamp connections. Covering layers of pileus: Epicuticular layer forming a palisade above the cutis formed by the hypodermal hyphae; terminal members of the palisade 8-12 μ thick, often depressed and becoming appiculate-rep, with intracellular pigment which is dissolved or not and brown-fuscous, frequently characteristically condensed into long and thin spiralling worm-like filaments.

On rotten wood of monocotyledoneous trees in rain forest fruiting towards the end of the rainy season.

BOLIVIA: Oriente (Dpto. Pando): Prov. Madre de Dios. Las Piedras. R. Singer B 2513, 5-IV-1956 (LIL, typus).

The present characteristic species is somewhat intermediate between the stirpes *Atriavellaneus* and *Nitens* and might perhaps be referred to either of them. For practical reasons, we thought it preferable to combine all species with at least a minority of truly globose spores. It might, in a future world monograph, be put in a stirps by itself.

The species is dedicated to Sergio Archangelsky, a friend and collaborator.

34. **Pluteus riberaltensis** Sing., spec. nov.,—Fig. 19.

Pileo radiatim rimoso. Stipite in typo albo. Cystidiis interne hyalinis. Sporis globosis. In silva pluviali ad lignum putrescente.

Var. **riberaltensis**, Fig. 19 R.

Pileus deep fuscous-sepia, *conga* (M&P 8-H-11), radially rimose, only a small disc remaining entire, subumbonate, rather obtuse, campanulate-convex, then more expanding, 40-42 mm. broad. Lamellae pink with pink edge, moderately broad, close, free. Stipe white, longitudinally striate, tapering upwards, without abrupt bulb, 68 x 5 mm., apex attenuated to 2.5-3 mm. Context white, unchanging, inodorous. Spores 4.8-7 x 4.5-6.7 μ , almost geometrically globose, mostly 5.2-5.5 x 4.8-5.1 μ , only 0.3-0.4 μ longer than broad, smooth, stramineous. Hymenium: Basidia 18-20.7 x 7.3-7.5 μ . Cheilocystidia forming an almost subheteromorphous border interrupted only by few basidia and pleurocystidia, 36-44 x 11-16.5 μ , similar in shape to the pleurocystidia but with even thinner walls and smaller in an average, hyaline, smooth. Pleurocystidia 41-86 x 12.5-39 μ , vesiculose or more often vesiculose-ampullaceous, with short and broad neck (mucro), or ventricose ampullaceous hyaline or subhyaline, not incrustated. Hyphae without clamp connections; hymenophoral trama invers, hyaline. Covering layers those of the pileus: consisting of a cutis of elongated hyphal elements, the terminal members cylindric or rarely with attenuated apex (pencil-like), 51-78 x 7.5-11 μ , the pigmented parts with distinct pigment condensations, few with homogeneously dissolved brown pigment. There are no pigmented or cystidioid elements on the surface of the stipe.

On rotting wood of dicotyledonous plants in the rain forest.

BOLIVIA: Oriente (Dpto. Beni): Prov. Vaca Diez. Riberalta. Singer B 2336 30-III-1956. (LIL, typus).

This species differs from *P. nitens*, *P. floridanus*, and *P. eupigmentatus* aside from other characters (cystidia, surface of pileus etc.) in the larger size of the carpophores which makes it easily recognizable.

34a. Var. **conquistensis** Sing., var. nov.,—Fig. 19 C.

Stipite longitudinaliter innate umbrino-griseo-fibrilloso differt.

Pileus fuliginous, radially rimose and showing the whitish flesh between the fibrils, the umbo remaining entire, not sulcate-convex, later becoming applanate-concave, the margin eventually uplifted, not



PLATE 19. *P. stephanobasis*, carpophores in natural size.

umbonate or slightly umbonate, ≈ 50 mm. broad. Lamellae pink with pink edge, rather narrow, close to almost crowded, free. Stipe white, innately longitudinally fibrillose with umber-gray fibrils, tapering upward, about 75 mm. long and 10 mm. broad at base, only 3 mm. broad at apex. Context white or whitish, unchanging, inodorous. Spores $5.5-6.3 \times 5.4-6.1 \mu$, almost geometrically globose, the least globose spores e. gr. $5.8 \times 5.5 \mu$, smooth, stramineous. Hymenium: Basidia 4-spored. Cheilocystidia moderately numerous (or collapsing) similar to pleurocystidia except for the "neck" which is about $15 \times 2.5-3 \mu$. Pleurocystidia e. gr. $38-41 \times 14-22.5 \mu$, not numerous (but perhaps easily collapsing?), hyaline, broadly ventricose-ampullaceous the neck most frequently again broader at the very apex with a constriction just above the ventricose lower portion (to 15μ in the broadest cystidia). Hyphae without clamp connections. Covering layer of pileus: consisting of cylindric hyphae, the terminal members and the cylindric elements anteceding them fuscous and often ascendant, $12-15 \mu$ in diam.

On very rotten wood in rain forest.

BOLIVIA: Oriente (Dpto. Pando): Prov. Manuripi, Conquista. R. Singer B 2177, 24-III-1956, (LIL, typus).

The variety differs from the type variety almost exclusively in having black stripes on the stipe.

35. *PLUTEUS NITENS* Pat., Bull. Soc. Mycol. Fr. **14**: 53. 1898.

This species has been introduced into the key because it may occur in parts of South America. Until now it is known with certainty only from Mexico. Data on the type can be compared in Trans. Brit. Mycol. Soc. **39**: 178 and fig. 27, 1956. The Argentine material tentatively described by me under this heading is not conspecific.

SECTION CELLULODERMA

Sect. *Celluloderma* Fayod, Prodrôme, Ann. Sc. Nat., Bot. **9**: 364. 1889.

Sect. *Micaceae* Lange, Dansk Botan. Ark. **2**(7): 4. 1917.

Sect. *Pruinosi* Imai, Journ. Fac. Agr. Hokk. Imp. Univ. Sapporo **43**(1): 161. 1938.

This section contains all species with a predominance of spherocysts in the epicutis of the pileus, or at least with a hymeniform layer of short (ellipsoid or saccate-obpyriform) elements, interrupted or not by few to many dermatocystidia (elongate cystidioid bodies which make the epicuticular layer dimorphic).

Type species *P. nanus* (Pers. ex Fr.) Kummer sensu Fayod, Lang et al.

Subsection *Mixtini* Sing., Trans. Brit. Mycol. Soc. **39**: 229. 1956, ex Sing. subsect. nov.

Dermatocystidiis in epicute pilei praesentibus vel elementis epicutis manifeste dimorphis. Typus subsectionis: *Pluteus psychriophorus* (Berk. & Br.) Sacc.

Dermatocystidia on the surface of the pileus present (or at least elements of the epicutis distinctly dimorphic). Type of the subsection: *P. psychriophorus* (B. & Br.) Sacc.

KEY TO THE STIRPES AND SPECIES

- A. Pileus gray, umber, olive gray, fuscous, bister, sepia, chestnut or chocolate, blackish brown. Edge of lamellae concolorous with sides or brown. Stipe not yellow.
- B. Lamellae pink, edge brown; cystidia brown; dermatocystidia obtuse
STIRPS EUGRAPTUS. 36. *P. eugraptus*
- B. Not combining these characters.
- C. Pileus strongly (at least one third of the radius) sulcate (not merely transparently striate or vaguely sulcate) or pectinate.
- D. All or the great majority of the dermatocystidia broadly rounded at their tip; acute dermatocystidia sometimes present but only in small numbers.....STIRPS LONGISTRIATUS
- E. Diameter of pileus about 2.5 mm.....37. *P. amazonicus*
- E. Diameter of pileus larger.
- F. Margin of pileus conspicuously long-pectinate; spores comparatively large (many over $7\ \mu$ long); center of the pileus not or scarcely venose or rugose, xerophytic-montane elements.....38. *P. longistriatus*
- F. Not combining the characters enumerated above. Subtropical and tropical species.
- G. Dermatocystidia very numerous. Center of pileus strongly venose and sometimes also rugose, pileus either not gray or—if partly gray—veins deeper colored....39. *P. neophlebophorus*
- G. Center of pileus smooth, or rugose or fuzzy granular, not venose.
- H. Spores $7\text{--}8.2 \times 5.5\text{--}7\ \mu$; pileus bicolorous, \pm gray, dermatocystidia relatively short, subtropical species.....40. *P. sanctixaverii*
- H. Spores $4.2\text{--}6.2 \times 3.5\text{--}5.5\ \mu$, frequently many almost geometrically globose; pileus warm brown. Tropical species.
- I. Epicutis of pileus composed of merely intermediate bodies (not obpiriform-subisodiametric and not much more than three times longer than broad), spherocysts and dermatocystidia very rare and scattered. Extratropical species.....41. *P. variipes*
- I. Epicutis with cylindric subventricose elements, their length reaching more than three times their breadth, usually not numerous but constantly present; spherocysts numerous. Tropical species
42. *P. oligocystis*
- D. A large number of the dermatocystidia narrowed to an obtuse or subacute tip or with a short thin mucro, sometimes all dermatocystidia so.....STIRPS BURSERAE
- J. Margin conspicuously sulcate.....43. *P. burserae*
- J. Margin not conspicuously sulcate (merely eventually sulcate or subsulcate, partially through loss of moisture)
(see "K")
- C. Pileus only short and vaguely sulcate or short transparently striate in some specimens, especially the thinner, older, drier ones, but not distinctly sulcate-pectinate unless by splitting of a rimosely separating cuticle (under certain specific climatic conditions).
- K. Dermatocystidia all or the great majority rounded-obtuse.
- L. Pileus in dry condition veined or rugose in the center; spores almost geometrically globose and (in South America) very small.....
STIRPS VENOSUS 44. *P. subminutus*

- L. Pileus smooth in the center, even in dry condition, or spores not globose.
- M. Spherocysts practically absent to very rare; pleurocystidia (in South America) very numerous. STIRPS RIMULOSUS 45. *P. polycystis*
- M. Spherocysts numerous. (see "M")
- K. Dermatocystidia all or the great majority short and narrowly mucronate, or attenuate-subacute to acute or gradually tapering to a thin obtuse tip. STIRPS PSYCHRIOPHORUS
 - N. Stipe white, not discoloured, not black-dotted. Pileus not radially rimose, subumbonate. 46. *P. umbrinoalbidus*
 - N. Stipe entirely black-dotted, fibrillose (use hand lens). Pileus on margin radially rimose, papillate. Tropical species. 47. *P. substigmaticus*
- A. Pileus red. Edge of lamellae red. Stipe yellow. STIRPS LAETUS 48. *P. laetus*

STIRPS EUGRAPTUS

This stirps is characterized by the dark-margined lamellae, the brown cystidia and the obtuse dermatocystidia: these three characters together are evident in an obviously pantropical species:

36. PLUTEUS EUGRAPTUS (Berk. & Br.) Sacc., Syll. 5: 678. 1887.
—Fig. 20.

Agaricus eugraptus Berk. & Br., J. Linn. Soc., Botany 11: 535. 1871.

Pileus a very deep brown to fuliginous to reddish-brown, for example *Vandyke brown* (M&P 7-A-11), unevenly velutinous, for example velutinous-radially striate (not transparently striate or sulcate) or glabrous around the disc and otherwise velutinous, and sometimes making the impression of being radially striped, usually rugulose to rugose on or around umbo but not truly venose, margin at first smooth, later often 1-3 mm., sulcate convex, umbonate with a small rounded umbo or papilla, eventually concave, 10-18 mm. broad, sometimes not circular in circumference. Lamellae white or whitish, then sordid pink, with a well marked or inconspicuous (macroscopically; under a lens always distinctly visible) dotted or continuous thin fuscous or bister line along the edge, broad to very broad, ventricose, close, free. Stipe pallid, sordid white or sordid brownish white, more colorless above, more fibrillose with fibrils concolorous with the pileus in lower portion of the stipe, or glabrous, or glabrescent, often curved, equal or subequal, 7-20 x 1-1.2 mm. Context whitish pallid to white, unchanging, inodorous. Spores 4.7-7.2 x 4-6.2 μ , mostly 5.8-6.5 x 4.8-5 μ , ellipsoid to subglobose, never globose, some rounded-angular, smooth, stramineous. Hymenium: Basidia 33 x 8.2 μ , 4-spored. Cheilocystidia forming a dense broad band marking the edge, very similar to the elements of the epicutis and likewise occurring in two types (1) corresponding to the short cells of the epicutis, 20-23 x 7-11.8 μ (2) corresponding to the dermatocystidia and then up to 130 x 10-35 μ , or else merely very versiform, 24-53 x 12-20 μ , mostly ventricose-ampullaceous with a broad neck or ventricose-vesiculose with or without a short and obtuse mucro, always broadly rounded above, at times short-vesiculose, hyaline or with a fuscous cell sap pigmentation variable. Pleurocystidia 22-55 x 10-23.5 μ , like the cheilocystidia, also somewhat variable but mostly

broadly ventricose below and ampullaceous with comparatively broad and always rounded neck (neck 10–12 μ broad), hyaline or filled with a fuscous cell sap, often with a short pedicel, thin-walled and not incrustated, in some individuals all pleurocystidia hyaline, usually numerous. Hyphae without clamp connections, those of the hymenophoral trama hyaline, the latter inverse. Covering layer of pileus: On top of an intermixed layer (small isodiametrical and short-elongated elements forming the hypodermium and being filled by a fuscous intracellular pigment, dissolved or locally condensed) there is an epicutis where two types of elements form a palisade: (1) spherocysts and subisodiametric elements which are mostly obpiriform to subglobose, 20–40 x 19–31 μ , also filled (more rarely not) with intracellular pigment, sometimes condensed, smooth; (2) dermatocystidia, usually relatively few as compared with the vesiculose elements, also usually filled with a brown, sometimes locally condensed pigment, but distinctly more elongate; ventricose to ventricose-ampullaceous or at times even subcapitate, 38–58–140 x 9–18–44 μ .

On dead fallen rotting dicotyledoneous wood in subtropical and tropical forest, fruiting during the rainy season.

BOLIVIA: Oriente (Dpto. Beni): Prov. Vaca Diez, Guayaramerín, Singer B. 2132, 18–III–1956. (LIL). Dpto. La Paz: Prov. Nor-Yungas, Río Yariza Singer B 1196, 16–II–1956 (LIL). ARGENTINA: Prov. Tucumán, Yerba Buena, Singer T 2153, 12–II–1955. (LIL). CEYLON, (K, type).

STIRPS LONGISTRIATUS

This is an important group of the present section, represented by a form of *P. longistriatus* and three or perhaps four typically South American species, one of the latter being of doubtful position.

37. *Pluteus amazonicus* Sing., spec. nov. ad int.

Pileus *clove* (M&P 15–C–12), with *bracken* (M&P 8–C–12) center and whitish margin, with small papilla convex to convex applanate with long-sulcate margin. Lamellae pale sordid pink, edge more purely pink, ventricose, close, free. Stipe hyaline white silky above, slightly more sordid pallid and subglabrous below, with a thickened base (0.6 mm. diam.), otherwise 4–4.5 x 0.3 mm. Context white, extremely thin. Spores 5.5–7.7 x 4.8–7 μ , subglobose, smooth stramineous-pinkish. Hymenium: Basidia 18–20.7 x 7.5–8.2 μ , 4-spored. Cheilocystidia 20–50 x 7.5–15.8 μ , short-cylindric to subvesiculose, very broadly rounded above, hyaline. Pleurocystidia e. gr. 34 x 16.5 μ , more versiform than cheilocystidia, often subampullaceous-fusiform, hyaline. Hyphae without clamp connections, trama hyaline. Covering layer of pileus: Elongated elements (40–55 x 5–11 μ) present in the epicutis, with broadly rounded tips, pigment fuscous, intracellular, often locally condensed. There are also occasional small spherocysts or otherwise shortened small elements which often give the impression of having been produced by secondary “budding” but not as a basic element of the epicutis in hymeniform arrangement.⁶

⁶This structure seems to be anomalous, but could not be rechecked on sufficient material because of the scarcity of the fructifications and their small size.

On a small stick of an unidentified species, rain forest.

BOLIVIA: Oriente (Dpto. Beni): Prov. Vaca Díez, Guayaramerín, Singer B 1587, 5-III-1956 (LIL).

This species is technically "incertae sedis" since it cannot be inserted with absolute certainty into this or the preceding section.

According to the data available it seems to be correct to describe it in the section *Mixtinus*, but since its natural position might be in *Hispidoderma*, it is keyed out in that section also. It is, however, without any doubt a new species and differs from all other species in its size, combined with the long-sulcate margin. In sect. *Celluloderma* it would be placed near *P. atriavellaneus*.

38. *PLUTEUS LONGISTRIATUS* (Peck) Sacc. Syll. Fung. **5**: 670. 1887.

—Fig. 21 and Trans. Brit. Mycol. Soc. **39**, fig. 52/53. 1956.

Agaricus longistriatus Peck, Ann. Rep. N. Y. State Mus. **30**: 40. 1878.

Pileus varying from mouse gray or cinnamon gray to deep sepia fuliginous, in South America often pale fuscous (but dried somewhat deeper fuscous in the center), sometimes also paler in the center and deeper colored around it, with rather loosely attached granules or flocons especially in the center but often appearing completely naked and glabrous, often with slightly rivulose-rimulose surface and rugulose center, the margin always deeply sulcate, and in mature specimens sulcate-plicate over at least one-half of the radius, ovoid to campanulate 12–30 mm. broad, 12–19 mm., high, sometimes slightly umbilicate. Lamellae white with white edge, then pink with pink edge, in young caps sometimes concolorous with the pileus in the upper zone in the marginal region later always unicolorous, at first ascendant, close to subclose, free. Stipe white, usually longitudinally striate, and sometimes fuliginous-fibrillose-punctate at the base (in South America macroscopically pure white), glabrous above, equal or slightly thickened downwards (not truly bulbous), 30–70 x 1.5–5 mm. Context white or grayish white at first with slightly more cinereous shades in base and near margin in young specimens, later usually all white or pallid, relatively moderately thin, moderately fragile unchanging when wounded, inodorous or with slightly acid-fungine odor. Spores 4.8–8 x 4.4–6.7 μ , mostly 6.8–7.8 x 5–5.7 μ , subglobose, more rarely short-ellipsoid, smooth, stramineous-pinkish. Hymenium: Basidia 23.4 x 8.2–8.6 μ , ampullaceous, 4-spored. Cheilocystidia very similar to the pleurocystidia (although often somewhat smaller and more numerous). Pleurocystidia 36–57 x 8.3–36 μ , either vesiculose or ventricose, in the latter case often somewhat ampullaceous or subcapitate, often with a very thin applicate resinous pale melleous incrustation (but others, particularly in South America—where they are predominantly ventricose-ampullaceous—quite hyaline without visible incrustation), without any intracellular pigment. Hyphae without clamp connections. Covering layers of the pileus: Epicutis consisting of globose to obpiriform cells, interspersed, although often (particularly in the South American form) sparsely, with dermatocystidia, all with either dissolved or locally condensed fuscous to very pale fusciduous sap, or without any pigment, spherocysts very numerous, e. gr. 25–45 x 21–24 μ ; dermatocystidia originally appearing as erect to ascendant terminal

members of subjacent hyphae, few (or moderately numerous), ventricose either below or in the middle, sometimes even vesiculose-ventricose, tapering conically or with a rather thin neck toward a subacute or obtuse tip, $43\text{--}170 \times 12\text{--}23 \mu$; also present few to numerous intermediate bodies with broadly rounded tip, cylindrical or oblong (e. gr. $57 \times 15 \mu$), occasionally with slight yellowish incrustations. Hypodermium underneath consisting of a cutis of brownish, almost hyaline or hyaline repent hyphae, some hyphae slightly ascendant.

On rotting wood of frondose, sometimes evergreen trees, in warm-xerophytic, subtropical and temperate forests and woods, widely distributed, fruiting in spring, summer and fall.

U.S.A.: N. Y. *typus* (NY). Florida Dade Co., Matheson Hammock, Singer F 893 (F). Mich., Cheboygan Co., Wolf's Bog, Singer N 174 (F). Ill. Geneseo. E. T. and S. A. Harper 3553 (F). ARGENTINA: Prov. Salta, Departamento Güemes, Yaquiásmé, Quebrada, Singer T 2959, 7-II-1957 (LIL).

The only South American collection fits so well into the description of the North American species that I have no doubt about its identity. The only noticeable difference is that the lamellae are subclose instead of close.

39. **Pluteus neophlebophorus** Sing., spec. nov.,—Fig. 22, 23.

Pileo pallido vel griseo-brunneo, vel olivaceo-griseo, margine avel-laneo-griseo, vel albo-olivaceo-griseo, circum discum vel in disco venis conspicuis fuscis vel fuligineo-nigris vel olivaceo-griseis ornato, disco ipso interdum rugoso, centro plus minusve tomentosulo, ceterum glabro vel glabrescente longe vel breviter conspicue sulcato vel pectinato et marginem versus interdum punctato, campanulato, convexo-umbonato, convexo-conico, 18–31 mm. lato, 7–23 mm. alto. Lamellis roseis, confertis. Stipite albo, subtiliter griseo-pallide vel avellaneo vel fusco-punctato-pruniato vel pruinato-fibrilloso ex toto vel ad basin tantum, gradatim subincrassato basin versus, $20\text{--}60 \times 2\text{--}6$ mm. Carne alba, inodora. Sporis $5.5\text{--}8.2 \times 4.2\text{--}7.5 \mu$, plerumque subglobosis, numquam globosis, cystidiis ventricosio-mucronatis vel ventricosio-ampullaceis, hyalinis vel stramineis. Epicute pilei ex elementis dermatocystidioideis admodum numerosis et sphaerocystibus perpaucis composita. Hyphis defibulatis. Ad lignum dicotyledoneum nec non ad terram arenosam in silva pluviali.

Pileus in the center brown, (e. gr. *Madrid* M&P 15-C-10), gray-brown, or pallid, more rarely deep olive gray, with fuliginous (*seal*, M&P 8-E-10) or blackish, more rarely deep olive gray strongly raised veins which join or not in a rugose disc, or cover the whole disc also, radiating from there toward the margin and in some caps anastomosing, somewhat finely tomentose in the central region, outwards usually subglabrous or glabrescent, strongly sulcate to pectinate over the outer 3–15 mm. of the radius of the pileus, where the sulcation is relatively short, often with punctate continuations of the veins out to the sulcate zone, campanulate to campanulate-conic, later conic-convex to conic-campanulate, eventually often even more repand, and then with a small distinct umbo, 18–31 mm. broad and 7–23 mm. high. Lamellae

pink with pink edges, medium broad to rather narrow, initially more or less ascendent in many caps, close, eventually subdeliquescent, free. Stipe white, finely punctate, or fibrillose-punctate, at times even venose-punctate at the base, rarely further up and in this latter case ornamentation whitish to grayish applanate, generally only at the base discolored to avellaneous to fuscous, solid, slightly longitudinally striate in many individuals, gradually and slightly attenuate upwards, not bulbous, 20–60 x 2–6 mm. Context white, unchanging, inodorous. Spores 5.5–8.2 x 4.2–7.5 μ , mostly all subglobose, sometimes some short-ellipsoid, never geometrically globose, all smooth and stramineous pinkish. Hymenium: Basidia 19.3 x 8.2 μ , 4-spored. Cheilocystidia like the pleurocystidia (or somewhat more slender), e. gr. 27.5–57–(75) x 11–24 μ . Pleurocystidia 25–57 x 10–27 μ , ampullaceous to ventricose-mucronate, rarely vesiculose, very rarely with one to two horn-like appendages at tip, entirely thin-walled, without fusciculous contents, but sometimes some slightly stramineous (innate incrustation?). Hyphae without clamp connections; trama of pileus, stipe and hymenophore hyaline. Covering layers: Epicutis of pileus consisting of palisades which are made up of two types of elements (1) and mostly of innumerable dermatocystidia 54–145 x 11–40 μ , these long-ellipsoid, clavate-, subfusoid, or ampullaceous like the pleurocystidia, very rarely subcapitate, either with equally dissolved fuscous cell sap, or with indistinct pigment condensations, few hyaline, (2) of very few to few, more rarely rather numerous spherocysts or subsodiametrical elements, always fewer than the dermatocystidia, likewise fuscous pigmented, few hyaline, 24–57 x 15–41 μ . There are also intermediate elements in some collections. On stipe: Dermatocystidia ventricose-mucronate or ventricose-ampullaceous, mostly hyaline, forming clusters in upper part of stipe causing the ornamentations of the stipe.

On dicotyledonous trunks and rotten logs in various types of rain forest, fruiting during the rainy season.

BOLIVIA: Oriente (Depto. Pando): Prov. Madre de Dios, Santa Teresa, Singer B 2290, 28–III–1956 (LIL, paratypus). San Luis, Singer B 2309, 28–III–1956 (LIL, paratypus). Dpto. Beni; Prov. Vaca Diez, Guayaramerín, Singer B 2128, 18–III–1956 (LIL, typus).

The three collections may be considered three different forms of this new species:

Forma **neophlebophorus**, Fig. 22, typically convex-umbonate, well colored but stipe relatively pallid even near base, umbo rugose, vein radiating from rugose umbo, spores relatively small: 5.5–7.5 x 4.2–6.2 μ . On sandy soil in deteriorated (best trees felled, burned through) rain forest. (B 2128).

Forma **sublongistriatus** mihi ad int., Fig. 23, S, characteristically campanulate and in length of pectination as well as in habit much like **P. longistriatus** but differing in strong veins and preponderance of the dermatocystidia over the spherocysts in the epicutis of the pileus, stipe with sometimes avellaneous veins. Near base on dicotyledonous trunks near inundation zone of rain forest (B 2309).

Forma **olivaceogriseus** mihi ad int., Fig. 23, O, characteristically conic-convex and with olive tinge, spores relatively large: 6.8–8.2 x 6–7.5 μ . On dead dicotyledonous wood in rain forest near inundated zone (B 2290).

40. *Pluteus sanctixaverii* Sing., spec. nov.,—Fig. 24.

A *Pluteo neophlebophoro* differt pileo mox centro depresso, rugoso-venoso, per tertiam externam radii pilei tantum sulcato, griseo. Stipite alboblocculoso. Cystidiis fusoido-ventricosus, frequenter apice minute tenuiter appendiculatis; dermatocystidiis paucis, sphaerocystibus epicuticularibus interdum tenuiter mucronatis, numerosissimis, pallidissime fusciculis vel hyalinis, pigmento numquam condensato. Ad lignum Lauracearum, in silva montana subtropicali.

Pileus gray (*acorn*, M&P 15-E-7), margin soon becoming *marron glace* (M&P 14-A-8), central two thirds rugose, marginal third sulcate, not splitting or rimose, subglabrous, convex with depressed center, 28 mm. broad. Lamellae pink, edge pallid flocculose, broad, ventricose, close, free. Stipe white and entirely flocculose, solid, becoming hollow, very slightly tapering upward, almost cylindrical, 43 x 5 (below), 4 (above) mm. Context white, fragile, especially in stipe, inodorous. Spores short ellipsoid to subglobose, not globose, 7–8.2 x 5.5–7 μ , smooth, stramineous. Hymenium: Basidia 22–33 x 7.5–9.5 μ , fusoid to ventricose, 4-spored. Cheilocystidia e. gr. 26 x 12 μ , hyaline, vesiculose but often with acute apex, not appendiculate or mucronate, or else with a tiny irregular appendage. Pleurocystidia. 52–55 x 11.7–24.5 μ , most frequently 11.7–16.5 μ , broad, fusoid-ventricose, broadest in or near middle in most instances, above often with a tiny irregular appendage, often collapsing in dried material and not very numerous, hyaline. Hyphae without clamp connections. Hymenophoral trama typically inverse. Subhymenium decidedly cellular, this and trama hyaline. Covering layers: Epicutis of pileus—a layer of spherocysts and slightly vertically elongated cells (dermatocystidia), the majority spherocysts or at least subsodiametric (e. gr. 28.5 x 24.8 μ), few dermatocystidia which are subfusoid—oblong without ampullaceous or mucronate tip, broadly rounded above, smooth, (e. gr. 72 x 23.5 μ); intermediate elements (e. gr. 59 x 22 μ) and spherocysts often with a narrow and rather short mucro (e. gr. 11 x 4 μ), all these elements filled with an evenly dissolved, very diluted fusciculous-hyaline to subhyaline cell sap. Flocculose layer covering the stipe consisting of spherocysts and short pyriform or obpiriform cells as well as ventricose to subclavate somewhat elongate bodies all either erect or ascendant, hyaline, 28–90 x 10–28 μ , few with long filiform neck.

On wood of *Phoebe porphyria* (Lauraceae) in subtropical forest. Fruiting in summer.

ARGENTINA: Prov. Tucumán, San Javier, Singer T 2878, 13-I-1957 (LIL, typus).

This differs from the nearest forms in this section by the characters enumerated in the Latin diagnosis. It forms a transition to section *Celluloderma* because of the scarcity of its dermatocystidia; there it would key out near *P. jamaicensis*, from which, however, it differs not only because of the presence of dermatocystidia on pileus and stipe but because of a number of other correlated characters.

41. *PLUTEUS VARIIPES* Sing. Trans. Brit. Mycol. Soc. **39**: 218. 1956.
—Fig. 25.

Var. *VARIIPES*;—Fig. 25, V.

Pileus deep porphyry fuscous to fuscous (*cattail*, *clove*, M&P 8-H/J-12, 15-C-12), then deep brown to deep chestnut brown (*cocoa*, *mohawk* or *cocoa brown*, M&P 7-E/H-12; 15-C-11), velutinous, under a lens soon becoming finely punctate velutinous in the center, and finely rivulose toward the margin, eventually fuzzy-granular almost all over, the young margin white crenulate denticulate and projecting in many specimens at times almost subrimulose (but never radially rimose) in age, usually macroscopically glabrous or subglabrous in age when fresh and moist, finely and distinctly long-sulcate-pectinate in the marginal region, campanulate, then convex, obtuse to subumbonate, 13–17 mm. broad. Lamellae white, then pink with white edge, ventricose, broad, close or subclose, free. Stipe white, at base with tiny appressed or non-appressed, later always appressed fibrils, pale umber or concolorous with the pileus, and visible under a hand lens or when the stipe begins to dry out but often difficult to observe macroscopically in fresh material, 19–35 x 1–4 mm., mostly 22–25 x 1–2 mm. Context white, unchanging, inodorous. Spores 4.5–6.2 x 4–4.8 μ , varying from almost geometrically globose to (usually more frequently) subglobose, smooth, stramineous-pinkish. Hymenium: Basidia 4-spored. Cheilocystidia 26–42 x 9.5–24.5 μ , mostly ellipsoid-oblong, with broadly rounded tips and a short pedicel, more rarely with a small mucro or a constriction in the middle (so that they appear capitate or subcapitate), or balloon shaped, always hyaline and thin-walled, non-incrusted, making the edge of the lamellae subheteromorphous or heteromorphous. Pleurocystidia few, generally similar to the cheilocystidia. Hyphae without clamp connections. Covering layer of the pileus: Epicutis consisting of a hymeniform or subhymeniform surface layer of three types of elements (1) few to moderately numerous spherocysts or subsodiametric elements, which are subglobose-balloon-shaped to obpiriform, 20–54 x 20–40 μ , (2) relatively many intermediate bodies which are clavate-vesiculose to ventricose-vesiculose, with or without a rounded appendage or mucro, 44–58 x 19–29 μ , (3) few more elongate bodies (which may be called dermatocystidia although they are not identical in shape with hymenial cystidia of any kind) varying from 2.5–3 times longer than broad but not very strongly projecting, 41–60 x 12–22 μ , type (2) not always clearly separable from type (3), all three types thin-walled, and with light brown or fuscous to deep brown or fuscous intracellular pigment, many cells with local pigment condensations.

In subxerophytic to tropical forest on leguminous (and probably other dicotyledonous) hosts, fruiting in small groups from January until February.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Yariza, R. Singer B 1425, 23-II-1956. (LIL). ARGENTINA: Prov. Tucumán, Quebrada de la Higuera, R. Singer T 2100, 25-I-1955 (LIL, typus).

Var. **atrofibrillosus** Sing. var. nov.,—Fig. 25, A.

A typo differt stipite conspicue fuligineo-griseo-fibrilloso.

Pileus and lamellae as above (var. *variipes*). Stipe white with a fuliginous-gray fibrillosity all over except the extreme apex, 22–35 x 2–4 mm. Context as above. Spores 4.5–6 x 3.5–5.3 μ , subglobose to short ellipsoid, smooth, stramineous-pinkish. Hymenium: Basidia 4-spored. Cheilocystidia 30–40 x 13.3–17.3 μ , clavate to ventricose, very rarely at apex mucronate, thin-walled, hyaline. Pleurocystidia moderately numerous or scattered, similar to the cheilocystidia but perhaps more often with an umbo-like mucro, often with a slightly thickened wall at the apex or at the base or both, hyaline, 34.7–67 x 16–37.5 μ . Hyphae without clamp connections. Covering layer: Epicutis of pileus mostly relatively elongate corresponding to the intermediate type (2) of the type variety, elongate-obpiriform to ventricose-vesiculose, not or sometimes short pedicellate, with intracellular brown or fuscous pigment, with more solid pigment bodies (mostly not evenly dissolved), very few subsodiametric or dermatocystidoid elements (if any).

On logs in subxerophytic mountain forest (mostly leguminous and anacardiaceous hosts), fruiting in summer.

ARGENTINA: Prov. Tucumán, Quebrada de la Higuera, R. Singer T 2099, 25–I–1955 (LIL, typus of the variety).

P. variipes var. *atrofibrillosus*, forms a transition towards the section *Celluloderma*, and for that reason had been published originally in that group (“*Eu-Cellulodermini*”). Additional material found recently in the Yungas of Bolivia confirms the constancy of the type variety and makes it possible to describe the aberrant form as a separate taxon.

42. **Pluteus oligocystis** Sing., spec. nov.,—Fig. 26.

A *Pluteo variipede* differt elementis epicuticularibus pilei maxima e parte neque isodiametricis (vel subsodiametricis-obpiriformibus) neque dermatocystidiiformibus (i.e. elongatis non magis quam tripliciter latitudine); dermatocystidiis pilei cylindraco-subventricosis usque ad 160 μ longis; dermatocystidiis fuscosuccosis stipitis in exsiccatis praesentibus. Stipite macroscopice albo pleurocystidiis nullis vel sparsis. Ad ligna putrida in silvis tropicalibus.

Var. **oligocystis**,—Fig. 26.

Pileo parvo (6–9 mm. lato), longe sulcolato, papillato; cheilocystidiis bififormibus; elementis intermediis epicuticularibus rarius mucronatis.

Pileus a deep warm brown in the center, bay on the margin (M&P 8–J–12; 7–E–11) finely velutinous when fresh and moist, in other specimens appearing pruinose, as they become drier (and dried), often fuzzy-granular on paler ground (under a lens), sulcate almost to the center not at all radially rimose, conic-convex to convex-subapplanate, with more declivous margin and papillate center, 6–9 mm. broad. Lamellae white then pink with white pruinose edge, medium broad, close, free. Stipe white, usually with tiny dark fibrils in certain portions (but visible only under a lens), macroscopically white and finely white pruinose to subglabrous or glabrescent, 10–15 x 0.5–1 mm. Context white, unchanging, inodorous. Spores in their majority sub-

globose, but also many truly globose, $4.2\text{--}5.5 \times 4\text{--}5.5 \mu$, smooth, stramineous-pinkish. Hymenium: Basidia $23.5 \times 8.2 \mu$, ventricose-ampullaceous, 4-spored. Cheilocystidia hyaline, dimorphous, (1) $18\text{--}20 \times 13\text{--}16.5 \mu$, vesiculose, balloon shaped, (2) $29\text{--}45 \times 9.5\text{--}19.5 \mu$, oblong-ventricose portions above and below the constriction about $9\text{--}9.5 \mu$ broad, constriction $3.5\text{--}4 \mu$ in diameter, sometimes simply mucronate. Pleurocystidia similar to cheilocystidia but rarely observed, very scattered. Hyphae without clamp connections. Oleiferous hyphae numerous. Covering layers: Epicutis of pileus consisting of (1) spherocysts which are rather numerous, $20.7\text{--}41 \times 19\text{--}34.5 \mu$; (2) dermatocystidia which are comparatively few, slightly ventricose below, ampullaceous with long and broad neck, or ventricose in the middle, or completely cylindric, $85\text{--}150 \times 16.5\text{--}20.7 \mu$, more rarely smaller (at times as small as $48 \times 10.3 \mu$); (3) intermediate elements which are numerous, relatively short, oblong, e. gr. $60 \times 27 \mu$. Hypodermium consisting of elongated repent elements forming a cutis below the epicuticular palisade, all elements of both epicutis and hypodermium with intracellular fuscous pigment which shows distinct pigment condensations in most cells. Caulocystidia present, some with dark sap (in dried material).

Gregarious on rotten logs and chips of dicot trunks in tropical mountain forest, fruiting in summer.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Yariza, Singer B 1420, 23-II-1956 (LIL, typus).

Var. **dennisii** (Sing.) Sing., c.n. (ad int.).

Pluteus psychriophorus var. *dennisii* Sing., Trans. Brit. Myc. Soc. **39**: 214. 1956. (ad. int.).

This has a slightly less warm color in the sketch at hand (M&P 14-K-10 to 15-C-12) but still very similar, is only subumbonate and shorter striate, much larger; $21\text{--}25$ mm. broad. Lamellae as above. Stipe as above but larger: $23\text{--}28 \times 2$ mm.

Microscopically very similar; spores indicated as $5.5 \times 4.5 \mu$, cheilocystidia subvesiculose-ventricose, broadly rounded, rarely with a beak-like mucro, e. gr. $35 \times 20 \mu$; pleurocystidia not indicated, apparently rare or absent. Epicutis consisting of spherocysts (e. gr. $40 \times 36 \mu$) and intermediate bodies (e. gr. subvesiculose-ventricose with short obtuse mucro, $55 \times 30 \mu$); besides some striking but not numerous strongly elongated (e. gr. up to $160 \times 16 \mu$) cylindric-subventricose dermatocystidia present. On the stipe there are similar but apparently somewhat shorter dermatocystidia (e. gr. $70 \times 5 \mu$), these and the elements of the epicutis of the pileus filled with a (purplish) brown sap.

In swarms on rotten trunks in cocoa plantation, fruiting in fall (October).

TRINIDAD: Non Pareil, Sangre Grande, Dennis no. 152, 11-X-1949 (K, v.i.).

The description given above is based on Dennis's notes and painting: Dennis, Bull. Soc. Mycol. Fr. **69**: 153. 1953, illustration unpublished (LIL, K) as *P. aethalus* var. *pulverulentus* (Murr.) Dennis.

This form is extraordinarily close to *P. oligocystis*. We have to wait for more collections before it is possible to judge whether var.

dennisii is an extreme (plantation-?) form or a fully autonomous geographic race or species.

P. oligocystis is extremely close to *P. variipes* var. *variipes* and can best be distinguished by a careful study of a good section of the epicutis of the pileus.

STIRPS BURSERAE

43. **Pluteus burserae** Sing., spec. nov.,—Trans. Brit. Mycol. Soc. **39**; fig. 62. 1956.

Pluteus psychriophorus var. *burserae* Sing., Trans. Brit. Mycol. Soc. **39**: 216. 1956. (ad. int.).

Ab aliis speciebus sectionis suae differt combinatione praesentiae majoritatis hypharum terminalium epicuticularium attenuato-acuminatarum subacutatum atque pilei fortiter sulcati ad marginem. Sporis 4.2–7.5 x 4–5 μ , nonnullis manifeste globosis. Cystidiis hyalinis obtusis. Carpophoris exiguis. Ad lignum in silva subtropicali et tropicali.

Pileus fuscous to light grayish chocolate brown (near *Malay*, M&P 15–C–11, sometimes *Vandyke brown*, M&P 7–A–11), or reaching a deep chestnut (*Mandalay*, M&P 8–L–12), subglabrous to granular, with long-sulcate margin, not umbonate or subumbonate to slightly obtusely umbonate, and the central region smooth, rarely scarcely uneven, not venose, not rugose, conic-convex or convex, eventually applanate or even with partially uplifted margin, not depressed in the center, 6–14 mm. broad. Lamellae sordid pink with pale pink edge, or pink with pink edge, rather broad to very broad, subclose, free. Stipe white, glabrous, equal or slightly thickened below, 10–16 x 1–1.2 mm., basal mycelium pubescent to cottony, white. Context white, thin, inodorous. Spores extremely variable as to their shape, 4.2–7.5 x 4–5 μ , from as globose as 4.2 x 4 μ , 5.1 x 4.9 μ , or 5.8 x 5.5 μ to rather subglobose or short ellipsoid, e. gr. $\frac{4.8-5.2-5.5-6.2-7.5}{4.1-4.4-4.5-5.5-6.6}$ μ , smooth, stramineous. Hy-

menium: Basidia 23–27 x 8.2–9 μ , ventricose, 4-spored. Cheilocystidia 15–44 x 11.7–19.3 μ , in some collections predominantly narrow 7–10 μ broad, hyaline or extremely pale fuscidulous, in the type mostly quite hyaline and broad-ellipsoid to vesiculose or vesiculose-mucronate or ampullaceous-subversiculose 23–36 x 11.7–19.3 μ . Pleurocystidia of the same shape and size as cheilocystidia, hyaline, in some collections on an average broader than the cheilocystidia, and with some irregularities but typically symmetric and even, scattered to rare. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of subisodiametric cells among which rise some vertical dermatocystidia; cells numerous, mostly globose, more rarely ellipsoid or obpiriform, with or without pedicel, 22–45 x 21–35 μ ; dermatocystidia ventricose-ampullaceous, constantly or predominantly attenuate to a thin or subacute tip, fusoid or broadly fusiform, neck where present thin and short (2–3 μ diam.), 62–150 x 11.3–33 μ , pedicel 2–33 μ long; there are also some intermediate bodies forming a transition in shape and size between the spherocysts and the dermatocystidia, rarely a few differing from the spherocysts merely in having a short thin mucro, or else from the dermatocystidia in being shorter and mucronate or broadly rounded at apex, and then usually cylindric-subventricose, e. gr. 38–56 x 11–32 μ ;

in all these different elements the pigment either evenly dissolved and light fuscous, in some collections concentrated in small droplets or with indistinct pigment condensations in a few of the epicuticular elements.

On rotten dicotyledonous wood, e. gr. *Bursera*, in "tropical hammock" vegetation, lower belt Yungas-vegetation, and in tropical rain forest, fruiting during the rainy season and shortly afterwards.

U.S.A.: Florida: Dade Co., Matheson Hammock, Singer F 1462, 9-XI-1942 (F). BRAZIL: Guaporé, Guajará mirim, Singer B 1805, 10-III-1956 (LIL). BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Suapi 1250-1300 m. alt. Singer B 1061, 9-II-1956 (LIL, typus).

The collection from the Amazonas region is, as usual, the smallest. The Florida collection has slightly narrower cheilocystidia and less ampullaceous dermatocystidia. The type (Yungas) has the deepest chestnut colored pileus. I do not believe that these small differences are of any real importance.

STIRPS VENOSUS

Characteristic for the stirps *Venosus* is the North American (but subtropical) species *Pluteus venosus* (Sing. ex) Sing.⁷ which does not seem to occur in South America. However, a closely related species has been found in South America. It shows the characteristic venose center in a much reduced manner, and the character becomes noticeable only in dry or dried material which has the center of the pileus rugose to somewhat veined. In *P. venosus*, on the contrary, the strongly venose center becomes almost smooth in dried material.

44. *Pluteus subminutus* Sing., spec. nov.,—Fig. 27, A-B.

Pileo atrocastaneo vel fusco, centro subtiliter rugoso vel venuloso sed in humidis sublevi vel paulum ruguloso, 6-11 mm. lato, margine vix vel brevissime sulcato, sporis minutis: 3.7-5.7 x 3.7-5.5 μ , plerumque globosis. Elementis epicutis pilei biformibus—sphaerocystibus et cellulis subelongatis—sed dermatocystidiis brevibus, crassis, rotundato-obtusis, pigmento condensato. Ceterum *P. venoso* simillima species. Habitat ad lignum putrescente arborum dicotyledonum.

Pileus fuscous with brown center, deep spadiceous-chestnut, or deep fuliginous-fuscous, e. gr. *Java* (M&P 8-J-10), subsmooth to rugulose in center when fresh and humid, on drying and in dried condition more rugose or even somewhat rugose-venose, very short sulcate in age, or mostly, not sulcate at all, velutinous to subglabrous, convex, obtuse (not umbonate), 6-11 mm. broad. Lamellae white, then pink, with the edges at first white, eventually pink, rather broad to broad, ventricose or subventricose, close or subclose, free. Stipe white when seen fresh and moist, but in dry condition and when dried sordid white above and very finely fuliginous-spotted or streaked below which may be visible only under a hand lens, or else making the basal region

⁷Species sectionis Mixtini pileo venoso, margine pellucide striatulo brunneo, stipite hyalino, basin versus pilis fuscidulis cystidioideis ornato, sporis globosis, nonnullis subglobosis. 5.7-6.7 x 5.5-6.5 μ . Epicute *P. seticipilis* modo constructa. Ad lignum foliaque emortua, Matheson Hammock, Dade Co., Floridae, Singer F 1107 (F), typus. *Pluteus psychriophorus* var. *venosus* Sing., Trans. Brit. Mycol. Soc. 39: 215. 1956 (ad. int.).

fuscidulous gray, upper portion at least under a binocular dark-dotted when dried, otherwise with silky to subglabrous surface, equal, 12–30 x 0.7–1.5 mm. Context white, inodorous. Spores 3.7–5.7 x 3.7–5.5 μ (in some carpophores 5.5–5.7 x 5–5.5 μ , in others as small as 3.7–5 x 3.7–4.7 μ), the vast majority almost geometrically globose, a minority subglobose, smooth, stramineous. Hymenium: Basidia 26–30.5 x 6.7–7.3 μ , 4-spored. Cheilocystidia 20.5–51 x 4.8–19.3 μ , very variable in number, shape and size, ampullaceous-vesiculose or vesiculose and narrowly mucronate, clavate, capitate, broadly ventricose, clavate-vesiculose, or like the pleurocystidia, very rarely narrowly cylindrical and small, mostly broadly rounded except when narrowly mucronate, rarely with a lateral mucro, hyaline except those very close to the margin of the pileus (where some are filled with a pale brownish sap), thin-walled, either making the edge subheteromorphous and so crowded that large stretches of the edge appear exclusively occupied by the cheilocystidia, or else rather scattered at places and mixed with basidia and basidioles. Pleurocystidia 23.5–50 x 10.3–18.7 μ , ventricose-vesiculose, ventricose-ampullaceous (very broad) or vesiculose with a broad obtuse mucro, often long-pedicellate, not incrustated, thin-walled, moderately numerous to numerous, hyaline. Hyphae without clamp connections. Subhymenium cellular, hyaline. Hymenophoral trama inverse, hyaline. Covering layers: Epicutis of pileus consisting of vesiculose bodies and more cystidioid elongate bodies which, however, are relatively short and broad, 2.5–4.5 times longer than broad and not reaching more than 40–66 μ in length, much of which is accounted for by a long pedicel (often 18–28 μ long) 13.5–20–(34) μ broad; spherocysts 16–25 x 15–19 μ ; intermediate bodies also present, on some caps very numerous (more numerous than the dermatocystidia-like bodies) and then forming a palisade with the spherocysts interspersed, otherwise a subhymeniform layer of short cells with the dermatocystidia interspersed. Pigment fuscous brown, intracellular, not evenly dissolved but varying between strikingly locally condensed and merely of somewhat uneven density.

On rotting or rotten dicotyledonous wood in tropical forest or its remainders, fruiting during the height of the rainy season.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Yariza, Singer B 1419, 23–II–1956 (LIL, typus). ARGENTINA: Prov. Salta: Dpto. Orán, 2 km. north of Orán, Singer T 2309, 17–III–1955 (LIL).

The dimorphic character of the epicutis is less strongly developed in the paratype than in the holotype, but the pigment condensations are more distinct in the former.

This species approaches *P. pulverulentus* (sect. Celluloderma) but differs in the structure of the cuticle of the pileus, in smaller size, weaker rugosity and not pure white stipe. The differences from *P. venosus* are contained in the Latin diagnosis. The weaker veins would seem to point to affinity with the following stirps, particularly *P. rimulosus* and *P. polycystis*, from which it differs in small truly globose spores.

STIRPS MINUTISSIMUS

This stirps, characterized by the rounded tips of the dermatocystidia and the short ellipsoid spores, smooth pileus (not venose or pectinate), might be subdivided into two-sub-groups:

(1) Stirps *Minutissimus* proper, with numerous spherocysts and numerous long dermatocystidia. *R. minutissimus* and f. *major*.

(2) Stirps *Rimulosus*, with numerous intermediate bodies but few true spherocysts and few truly cystidioid bodies, thus similar in cuticle structure to *P. subminutus*. Here: *P. rimulosus* and *P. polycystis*.

In the larger sense this stirps contains *P. minutissimus* and related European forms, *P. rimulosus* (according to the descriptions by Kühner and Romagnesi) and (*P. polycystis* Sing., most probably also *P. grandineus* (Berk. & Br.) Sacc. Of these, only *P. polycystis* is known to occur in South America.

45. ***Pluteus polycystis* Sing., spec. nov.,—Fig. 28–29.**

A *P. rimuloso* differt pileo haud rimoso, minore, pleurocystidiis numerosis; a *P. grandineo* differt sporis minoribus; a *P. minutissimo* differt sphaerocystibus epicuticularibus admodum sparsis. Ad truncum.

Pileus entirely fuliginous (*cattail*, M&P 8–H–12), with smooth margin (not even transparently striate, with smooth center which eventually becomes coarsely uneven ridged (not as in *P. venosus*) not hygrophanous but having a slight tendency to become bleached in some places, especially in the center, finely punctate under a binocular, but never rimose, 18 mm. broad. Lamellae at first white with white edge, later pink form spores, medium broad, close, free. Stipe silvery white, glabrous, tapering upward, 34–39 x 3–4 mm., basal mycelium white. Context whitish, inodorous or almost so. Spores 5.5–7 x 4.8–5.7 μ , short ellipsoid, some subglobose, none globose, smooth, stramineous. Hymenium: Basidia 4-spored. Cheilocystidia and pleurocystidia equal. Cystidia extraordinarily numerous for this section, 43–62 x 14.5–19.5 μ , ampullaceous, with even and entire apex, without incrustation, with thin wall, hyaline, apex 8–11 μ broad and broadly rounded; edge homomorphous. Hyphae without clamp connections. Hymenophoral trama invers, hyaline. Covering layer of pileus: Epicutis consisting of a palisade made up of dermatocystidia with a few scattered spherocysts occasionally intermixed, the latter rare, 12.5–28 x 12–17.5 μ , often pedicellate; dermatocystidia moderately long and moderately projecting, 36–57 x 9–22 μ , clavate, cylindric, broadly fusoid, ampullaceous, usually broadly rounded above, rarely (this being the next to the last member) with a large isodiametric globose cell attached to the tip of the dermatocystidium like an appendage or else with a narrow subfilamentous apiculus or appendage, all these elements superimposed over a cellular hypodermium; elements of the hypodermium and the epicutis filled with a fuscous intracellular at least partly dissolved and distinct pigment condensations but after leaving the preparation for several hours in NH_4OH and then reviving it in KOH , the condensations become very indistinct or disappear.

On rotting dicotyledonous trunk on a humid place in subtropical forest or fruiting before the winter rainy season during relatively dry weather.

ARGENTINA: Prov. Misiones: Dpto. Iguazú, Refugio Yaguareté, Parque Nacional Iguazú, R. Singer M 1066, 17–IV–1957 (LIL, type).

This collection, clearly different from all other species of this section, was rather young, but one specimen was obviously mature. The

numerous pleurocystidia are characteristic. *P. grandineus* from Ceylon which seems to be very closely related, differs in larger spores. (6.7–9 x 5.3–5.7 μ). Its macroscopical characters and appearance are approximately identical in both these thermophilous species (cf. illustration in Trans. Brit. Mycol. Soc. **39**: 200, fig. 50, 1956).

Among the European species, *P. rimulosus* Kühner & Romagnesi seems to be closest. It is larger, rimose like an *Inocybe*, and lacks pleurocystidia (cf. illustration in Bull. Soc. Mycol. Fr. **72**: 196, fig. 9, and 225, fig. 24, 1956.).

Among the South American species this comes closest to *P. subminutus* Sing., which, among other differences, can be easily distinguished by the almost geometrically globose spores.

STIRPS PSYCHRIOPHORUS

This stirps is characterized by dermatocystidia which are reminiscent of the terminal cells of the palisade of the epicutis as found in *Pluteus fuliginus* of the preceding section, i.e. they are gradually acuminate or subacute, not or rarely broadly rounded as in the preceding stirpes.

The following species belong in this stirps: *Pluteus umbrinoalbidus* Sing., *P. substigmaticus* Sing. from South America, *P. seticeps* (Atk.) Sing. comb. nov. (*Leptonia seticeps* Atk., Journ. Mycol. **8**: 116. 1902), which is the same as *P. nanellus* Murr. from North America, and *P. psychriophorus* (Bk. & B.) Sacc. and *P. stigmatophorus* (Bk. & B.) Sacc. from tropical Asia.

46. *PLUTEUS UMBRINOALBIDUS* Sing., Lilloa **26**: 134. 1953,—Fig. 30.

Pileus deep grayish fuliginous *biskra* (M&P 16-A-12), slightly sulcate at places in the marginal zone, velutinous all over, becoming, except for the disc, rivulose and criss-cross rimulose showing the white context especially when seen in dried condition under a lens, but never radially rimose, convex, eventually depressed, subumbonate, 13–20 mm. broad. Lamellae pink, with pink edge, broad, close, free. Stipe entirely white, finely fibrillose, glabrescent, equal, 15–23 x 1–2.5 mm. Context white, inodorous. Spores 4.8–7 x 4.2–6.5 μ , subglobose to quite geometrically globose, in about equal proportion, smooth, stramineous. Hymenium: Basidia 22–26 x 7.5 μ , ventricose-fusoid, 4-spored, few 2–3-spored. Cheilocystidia 30–40 x 13–13.5 μ , hyaline, vesiculose to vesiculose ventricose, in some slightly attenuated above, or broadly ampullaceous, but always broadly rounded at the tip, thin-walled. Pleurocystidia either easily collapsing or scarce, few seen, similar to cheilocystidia. Hyphae without clamp connections. Hymenophoral trama invers, hyaline. Covering layers of the pileus: Epicutis consisting of subisodiametric elements and dermatocystidia, both of these elements easily overlooked since they are locally conglomerated and unevenly distributed, not evenly intermixed in many specimens, short elements and elongated ones fuscous with local pigment condensations, the former 26–34 x 20–31 μ , the latter numerous, 65–100 x 16–21 μ , fusoid to ventricose with narrowed-obtuse to subacute narrow mucro or plainly fusoid and subacute, very few with rounded tip.

On rotten wood in subtropical forest, fruiting during relatively dry weather at the end of the rainy season.

BRAZIL: Rio Grande do Sul, Estac. São Salvador, R. Singer B 124 9-XI-1951 (LIL, typus).

This differs from the Asiatic *P. psychriophorus* which is closely related, by more predominant and more variable, shorter dermatocystidia and strongly umbonate (initially campanulate-conic) pileus.

47. ***Pluteus substigmaticus*** Sing., spec. nov.,—Fig. 31.

A *Pluteo umbrinoalbido* differt stipite nigro-fibrilloso, macroscopice sordido, pileo papillato, dermatocystidiis obtusioribus. In truncis in silva pluviali.

Pileus deep umber, subvelutinous, on margin radially rimose, in an intermediate zone concentrically rimose, on disc non-rimose, showing the white flesh where exposed through rimose splitting of the cuticle, convex, becoming flattened or slightly depressed around the papilla, 17 mm. broad. Lamellae pink, with pink edge, broad, ventricose, free. Stipe sordid macroscopically because of the presence of fine (well visible under a lens in dry stage) fibrils which form a faint blackish punctation on white ground, subequal or slightly attenuate below, not bulbous, $17 \times 2\text{--}2.5$ mm., tending to be somewhat eccentric. Context white, inodorous. Spores $5.6\text{--}6.2 \times 5\text{--}5.5 \mu$, some almost geometrically globose, others, particularly the larger ones only subglobose, smooth, stramineous. Hymenium: Basidia $24.5\text{--}28.3 \times 7.2\text{--}8.3 \mu$, fusoid, 4-spored. Cheilocystidia and pleurocystidia equal, except that the former are sometimes smaller (near lower limits of general measurements:), cystidia $15.5\text{--}42 \times 10.3\text{--}16.5 \mu$, balloon shaped, sometimes (especially pleurocystidia) somewhat constricted in the middle, sometimes more clavate (especially cheilocystidia), frequently vesiculose-ventricose, or vesiculose ventricose with an indistinct to distinct mucro. Hyphae without clamp connections. Hymenophoral trama and trama of pileus hyaline. Covering layers: Epicutis of pileus—a palisade consisting of almost globose bodies (spherocysts), intermixed with elongated elements (dermatocystidia); spherocysts e. gr. $48 \times 33 \mu$ with a short ($5\text{--}6 \mu$) pedicel and sometimes with a small apiculus at the tip, internally fuscous, often with distinct pigment condensations and pigment bodies inside; dermatocystidia $45\text{--}86 \times 12\text{--}42 \mu$, mostly ventricose or ventricose-subvesiculose and mucronate with a short and narrow to broad, usually obtuse mucro, somehow intermediate between the acuminate and the rounded-obtuse type of showing both extremes. Underneath the epicuticular layer there is a cutis representing the hypodermium, its hyphae more or less parallel and $4\text{--}7 \mu$ diam., fuscous from an intracellular pigment which is partly dissolved and partly locally condensed. Blackish fibrils of the stipe consisting of bunches of cystidioid hairs scattered over the surface.

On wood of dicotyledonous trunks in rain forest.

BOLIVIA: Oriente (Dpto. Pando): Prov. Manuripi, Conquista. R. Singer B 2183. 24-III-1956. (LIL, typus).

This differs from the preceding species in the characters indicated in the Latin diagnosis. It differs from *P. oligocystis* in being larger and non-sulcate and having larger spores. *P. oligocystis* var. *dennisii* has at least the size of *P. substigmaticus* but differs in the shape of the dermatocystidia, the striate margin and the habitat. Both are dif-

ferent in the color of the pileus (not umber) and the absence of any kind of rimosity. *P. substigmaticus* differs from *P. stigmatophorus* in having hyaline cystidia, shorter dermatocystidia and perhaps smaller average size of the carpophores.

STIRPS LAETUS

This is the only species of a stirps which differs from all others in the bright pigment of the pileus, lamellae and stipe. This species and stirps is apparently closely related to the bright colored *Plutei* of the subsection *Eucellulodermini*, and, together with such species as *P. variipes*, *rimulosus*, and *polycystis*, serves to show that the subsection *Mixtini* cannot be treated as a section independent of *Celluloderma*-*Eucellulodermini* with the same status as section *Pluteus* and section *Hispiderma*.

48. *Pluteus laetus* Sing., spec. nov.,—Fig. 32.

Pileo rubro, margine sulcato, papillato, 13 mm. lato. Lamellis rubris, dein roseis, acie rubris, stipite flavo, pruinoso. Sporis 5.5–7.5 x 5–6.8 μ . Epicute pilei consistente e sphaerocystibus et dermatocystidiis (nec non elementis intermediis), dimorpha. Ad lignum emortuum in silva pluviali.

Pileus red (Brazil r. M&P 4-K-12), subvelutinous to subglabrous, with sulcate margin, not rugose and not rimose, convex then applanate, with small papilla-like umbo, about 13 mm. broad. Lamellae red with yellow (*golden rod*, M&P 10-L-5), pruinose, subequal to slightly tapering upwards, 23 x 2 $\frac{1}{4}$ mm. Context thin, inodorous. Spores 5.5–7.5 x 5–6.8 μ , mostly 5.7–6.8 x 5–6.2 μ , few almost geometrically globose (6.2 x 5.9 μ , 6.5 x 6.5 μ etc.) most about 0.6–0.7 μ longer than broad, smooth, stramineous, pinkish. Hymenium: Basidia 20.7–23.4 x 7.7–9.7 μ , 4-spored. Cheilocystidia and pleurocystidia similar. Cystidia varying from vesiculose-fusoid to vesiculose-ampullaceous, 24–39 x 13.7–19.3 μ , broadly rounded above, often with a basal globose cell. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of spherocysts and somewhat elongated cystidioid elements (dermatocystidia); spherocysts 19–28 x 16.5–23.5 μ , hyaline, sometimes pedicellate; dermatocystidia 35–59 x 18–23.5 μ , shaped like the hymenial cystidia or clavate or with a short and very thin apiculus, hyaline.

On dead dicotyledonous wood in rain forest.

BOLIVIA: Oriente (Dpto. Beni): Prov. Vaca Diez, Ivon, Singer B 2483, 3–IV–1956. (LIL, typus).

This species can be confused with others of the same color, such as *P. rubrotomentosus* and *P. lactifrons*. An analysis of the cuticle is the best manner of differentiating between them with certainty.

SUBSECTION EU-CELLULODERMINI Sing.

Trans. Brit. Mycol. Soc. **39**: 222. 1956 (sine diagn.⁸)

The structure of the epicutis of the pileus in this subsection varies from a monostratous subhymeniform layer of monomorphic elements

⁸*Eucellulodermini* Sing. (subsect.) Epicute pilei ex elementis subisodiametricis haud vel vix dimorphis formata. Species typica: *P. nanus* (Pers. ex Fr.) Kummer sensu Fayod.

(spherocysts or little elongated subisodiametric bodies) to an epithelium (in the widest sense of the word) inasmuch as the underlying layer is often subcellular. Dermatocystidia or cells longer than twice their breadth are absent (difference from the *Mixtini*).

The type species, *P. nanus* in the sense of Fayod and most authors is evidently a poorly defined species, and it should be left to the judgment of a European monographer whether he feels that *P. nanus* can be maintained as an emended specific concept, or rather as a collective species, traditionally of the present subsection.

KEY TO THE SPECIES

- A. Pileus, lamellae, or stipe of the carpophores either yellow, orange, or red.
 - B. Cells of the epicutis of the pileus hyaline or yellowish, sometimes a few with orange cinnamon to pale cinnamon sap; pileus varying between red, orange, and yellow.....STIRPS CHRYSOPHLEBIUS
 - C. Spores almost all or the majority almost geometrically globose; pileus orange red to scarlet red; cystidia not ampullaceous with long neck.....49. *P. laetifrons*
 - C. Spores subglobose to short-ellipsoid, or all subglobose, some forms with a number of globose spores in each print, and the cystidia with long neck, ampullaceous; pileus yellow or golden yellow to almost orange yellow, never orange red to scarlet red, even when quite fresh and young.....50. *P. chrysophlebius*
 - B. Cells of the epicutis of the pileus rarely hyaline, the majority always with a pale fuscous to brown cell sap; pileus never pure red, orange or yellow, but rather gold brown or umber and at best with some yellow inixture. (at least in native forms).
 - D. Spores almost geometrically globose.....STIRPS GLOBIGER
 - E. Pileus a dusky grayish brown (Natal brown) to olive gray.....51. *P. xanthopus*
 - E. Pileus a rich brown, umber-spadiceous, fuscous brown, on yellow ground (the yellow ground sometimes invisible).....52. *P. globiger*
 - D. Spores not globose.....STIRPS LUTESCENS 53. *P. lutescens*
- A. Pileus, lamellae, and stipe without any bright (red, orange or yellow) tones.
 - F. Cystidia on the edge or on the sides, or both, with fuscideous sap.....STIRPS MARGINATUS
 - G. Edge of the lamellae distinctly discolored (fuscous); Pleurocystidia fuscous.....54. *P. luctuosus*
 - G. Edge of lamellae before drying not discolored (concolorous with sides) or gray to pale brown in the third (or less) nearest the margin of the pileus.
 - H. Pileus with an epicutis formed by cells with evenly dissolved pigment. Rain forest logs.....55. *P. beniensis*
 - H. Cells of epicutis with pigment condensations and vacuolar pigment.
 - I. Pileus 17-18 mm. broad, glabrous or subglabrous, not rugose. On earth or on rootlets.....56. *P. riograndensis*
 - I. Pileus (18)-27-78 mm. broad, the smaller specimens often rugulose or venose, tending to crack rivulously from the marginal zone inwards. On and around monocot trunks.....57. *P. rimosoaffinis*
 - F. Cystidia on edge and sides hyaline.
 - J. Pileus practically without pigment, or almost pallid, or nearly all white.....STIRPS ALBORUGOSUS 58. *P. hololeucus*
 - J. Pileus distinctly pigmented and white only rarely on the extreme margin or by exceptional bleaching, or through rimosity.
 - K. Center of pileus rugoso-venose, at least slightly rugulose or finely veined in dry condition in a fair number of the specimens of a population.

- L. Spores, at least many of them almost geometrically globose.....STIRPS PULVERULENTUS
 M. Pigment in epicutis often condensed.....
 59. *P. pulverulentus*
 M. Pigment in epicutis evenly dissolved, or very rare spherocysts with an occasional indistinct condensation.
 N. Stipe white all over; pileus relatively light colored. On dicot wood in rain forest.....
 60. *P. eliae*
 N. Stipe cinereous striped; pileus fuscous. On Sapium in xerophytic extratropical vegetation.....
 61. *P. sapicola*
 L. Spores practically all at least 0.5μ longer than broad, not truly globose.....STIRPS JAMAICENSIS
 O. Epicuticular elements with internal pigment condensations pileus sepia or porphyry brown, usually deep colored; tropical species.....62. *P. fluminensis*
 O. Epicuticular elements with evenly dissolved pigment; pileus deep brown or olive brown with paler margin; subtropical species.....63. *P. jamaicensis*
 K. Center of pileus smooth, even when dried.....STIRPS TUCUMANUS
 P. Epicuticular cells with pigment condensations. Spores $3.8-5.5 \times 2.7-3.8\mu$64. *P. tucumanus*
 P. Epicuticular cells with evenly dissolved pigment. Spores $5-6.8 \times 4-6\mu$
 Q. Pileus becoming radially rimose like an *Inocybe*; stipe white.....65. *P. fallax*
 Q. Pileus sulcate over half of the radius, but not rimose, stipe white with umber base.....66. *P. iguazuensis*

STIRPS CHRYSOPHLEBIUS

This group contains the species with the brightest colors, one red to orange and one golden yellow, both appearing composed of a number of races or microspecies of forms which, at the present state of knowledge—some being known by one collection each—can be recorded only as varieties of what might be a “linnaeon” to be split up later if necessary.

49. PLUTEUS LAETIFRONS (Berk. & Curt.) Sacc., Syll. Fung. 5: 677. 1887.—Fig. 33.

Agaricus laetifrons Berk. & Curt., Journ. Linn. Soc., Bot. 10:289. 1868.

Var. LAETIFRONS;—Fig. 33, L.

1. Description of the type⁹

Pileus orange-red, margin radially-striate, glabrous, conic to plane, 3–12 mm. broad. Lamellae yellow, broad, free. Stipe (orange-) red, glabrous, slender, slightly enlarged at base, 25×1 mm. Spores $4.5-5.5 \times 4.3-5.3\mu$, nearly globose to globose, smooth stramineous. Hymenium: Basidia $19.5 \times 5.5\mu$. Cystidia easily collapsing, hyaline, on both edges and sides of lamellae, vesiculose (rather large). Covering layer of pileus: Epicutis consisting of hyaline, smooth, subglobose elements.

On decayed wood, CUBA: Wright no. 94 (K, FH, typus).

⁹This is a combination of the description given by Berkeley from Wright's notes and specimens, and the data from my type studies. We add this for the sake of comparison although it is based on Cuban material rather than South American specimens.

2. Description given by Dennis (fig.: Bull. Soc. Mycol. Fr. 69, pl. II, fig. 6. 1953).

Pileus "cadmium yellow" with "cadmium orange" (R.) striae, glabrous, dry, conic, then convex, 14–15 mm. broad. Lamellae "maize yellow" (R.), up to 2.5 mm. broad (i.e. broad), close, free. Stipe concolorous with the pileus, glabrous equal, hollow, 17–19 x 1 mm., basal mycelium tomentose, white. Context concolorous, thin, paler in the stipe. Spores spheric, 5–6 μ diam. Hymenium: Cheilocystidia thin-walled, hyaline, vesiculose or obpiriform, 40 x 25 μ . Covering layer of pileus: formed by spheric thin-walled cells of 20–35 μ diameter.

On rotten wood: ombrophilous in mountain forest.

TRINIDAD, near Arima, Dennis no. 67, 25–IX–1949 (K, v.s., v.i.)

Var. **bolivianus** Sing., var. nov.,—Fig. 33, B.

A varietate typica differt sporis nonnihil maioribus; sphaerocystibus epicutis pilei hyalinis et—aliis—pigmento cinnamomeo dissoluto gaudentibus.

Pileus when fresh deep orange, rusty orange (*tile* r. M&P 3–D–12), the margin faded to *yellow ochre* (M&P 11–L–7) when dried with an amber shade from tiny dark brown dots visible under a good lens, subglabrous, 14–15 mm. broad. Lamellae yellow (M&P 10–K–5), edge somewhat paler, broad, somewhat ventricose (4 mm. broad) close, free. Stipe yellow (M&P 9–L–5), glabrous or subglabrous, equal, with a very small bulb 24 x 1.5 mm., bulb 2.5 mm. in diam., basal mycelium white. Context inodorous. Spores 5.3–6.8 x 5.3–6.8 μ , almost all (very few exceptions) almost geometrically globose, smooth, stramineous. Hymenium: Basidia 4-spored, 24–33.5 x 7.8–10.8 μ . Cheilocystidia and pleurocystidia similar, hyaline, very numerous on the edges, varying between clavate and vesiculose-subampullaceous, some very broad and tennis-racket shaped, (19.3)–34–55 x (9)–11–27.5 μ . Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of globose and subglobose cells, dermatocystidia none; some spherocysts hyaline (many), but those of the dark spots of the pileus filled with an evenly dissolved pigment which is orange cinnamon to pale cinnamon (in herbarium material, KOH, NH₄OH).

On bark of dead fallen branch in mountain tropical forest.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Coroico. Singer B 889 4–II–1956. (LIL, typus).

This variety is separated from the type from Cuba by (1) darker deep colored spots on the pileus which consist of pigmented epicuticular cells and (2) by somewhat larger spores. The color of the pileus and the surface markings may also be different since our specimen was deep orange rather than red and not radially striate-striated. On the other hand, this may have been an individual variation or come about with the age of the carpophore so that we hesitate to consider these last characters as diagnostic.

In Florida I have collected another form which is intermediate between var. *laetifrons* and var. *bolivianus* and which may be characterized by (1) bright red pileus, with margin slightly and shortly sulcate or striate, 10–15 mm. broad. Lamellae sordid cream. (2) Spores 5.7–6.8–(7.5) x 5.3–6 μ , varying from almost geometrically globose to subglobose or even more elongate (e. gr. 6.8 x 6 μ). Cystidia

submucronate, e. gr. $33 \times 16.5 \mu$, hyaline. (3) Epicuticular elements all hyaline. Dade Co. near Miami in "tropical hammock" in fall, Singer F 933, F 933a.¹⁰ (F).

The form described (Bull. Soc. Myc. Fr. **49**: 152. 1953) from Trinidad by Dennis and illustrated (pl. 4, fig. 6, l.c.) by him would appear to be identical with the type form having the long-radiate-striate pileus of the former and apparently intermediate spores (illustrated as not quite globose). This is a rather old specimen and may have bleached from a brighter red to yellow with "cadmium orange" (R.) striae, as shown by Dennis.

It is most probable that the Trinidad form is an extreme form within the range of variation of var. *laetifrons*. Therefore, we add Dennis' description to that of the type description.

As for a survey of the varieties see p. 280 (after *P. chrysophlebius*).

50. *PLUTEUS CHRYSOPHLEBIUS* (Berk. & Rav.) Sacc., Syll. Fung. **5**: 678. 1887;—Fig. 34.

Agaricus chrysophlebius Berk. & Rav. in Berk. & Curt., Ann. Mag. Nat. Hist. III. 4: 289. 1859.

Agaricus admirabilis Peck, Ann. Rep. N. Y. State Mus. **24**: 64. 1872.

Pluteus admirabilis (Peck) Peck, Ann. Rep. N. Y. State Mus. **38**: 317. 1885.

Nolanea bruchii Speg., Bol. Acad. Nac. Cienc. Cordoba **29**: 124. 1926.

Pluteus chrysophlebius ssp. *bruchii* (Speg.) Sing., Trans. Brit. Mycol. Soc. **39**: 196. 1956.

Ssp. *sublaevigatus* Sing. ssp. nov.;—Fig. 34, S.

A ssp. *chrysophlebio* differt sporis variabilibus interdum geometricae globosis.

Pileus on disc deep golden yellow (*Florida gold* M&P 10-L-8), otherwise deep yellow (*Spanish y.*, M&P 10-L-7), transparently striate over $\frac{3}{4}$ to $\frac{4}{5}$ of the radius, hygrophanous, dry assuming the color of the margin in the center, and fading to *golden rod* (M&P 10-L-5) in the marginal portion, the disc seemingly smooth when wet, but in dry or dried condition becoming rugulose, glabrous, convex, 13-18 mm. broad. Lamellae pink, *Japan rose* to *woodland rose* (M&P 3/4-A-10), ventricose, very broad, subclose, free. Stipe *Narcissus* yellow (M&P 10-K-4), glabrous, equal, curved, solid, 15×1.5 mm. Context in moist state concolorous with the surfaces, dry more pallid to white in parts, thin, inodorous. Spores $5.5-7.2 \times 5.5-6.5 \mu$, varying from as globose as $\frac{5.5-6.3}{5.5-6.2} \mu$ to definitely subglobose (e. gr. $\frac{6.9-7.2}{6.2-6.5} \mu$, more fre-

quently globose than subglobose if the spores are small, more frequently subglobose if they are large, smooth, stramineous. Hymenium: Basidia 4-spored. Cystidia on edges and sides of lamellae, vesiculose to ampullaceous, about $35 \times 15 \mu$ if vesiculose, about $53 \times 9.5 \mu$ if ampullaceous, neck e. gr. $25 \times 4 \mu$. Covering layer of pileus: Epicutis consisting of cells $18-65 \mu$ in diameter, hyaline, with a tendency to become thick-walled.

On wood of a vine (Dicotyledones) in shady moist mountain tropical forest, gregarious, fruiting in the rainy season.

¹⁰For this form, the varietal name var. *floridae* Sing. var. nov. ad int. is proposed in order to be able to refer to this.

BOLIVIA: Dpto. La Paz, Prov. Nor-Yungas, Charobamba, Singer B 1147 13-II-1956 (LIL, typus).

This subspecies is intermediate between this and the preceding species. It differs from the Northern form (*P. admirabilis*) in a certain percentage of almost geometrically globose spores and perhaps in slightly less rugose center, which is not visibly veined in fresh condition, at least in our collection. It differs by the same spore character from the Southern South American race which, possibly, also differs in smoother center. It differs from *P. laetifrons* var. *laetifrons* and var. *floridae* in the shape of the cystidia and the color of the pileus.

Ssp. BRUCHII (Speg.) Sing. l.c.;—Fig. 34, B.

Pileus yellow (M&P 9-K/L-3), sometimes duller (*brass* M&P 11-L-6 to more golden, *golden glow* (M&P 9-L-6), mostly more like the former in tone quality and like the latter in intensity, glabrous, smooth, or very slightly rugulose in the center, margin soon becoming transparently striate, and/or sulcate over more or less one half of the radius, dry (not viscid, but at times subhygrophanous), campanulate, then convex, eventually convex-applanate, or applanate, umbonate or subumbonate or non-umbonate, 11-25-(32) mm. broad. Lamellae pink, broad, ventricose, close or subclose, free. Stipe concolorous with the pileus or at least citrine below, with the apex varying from pallid to white, glabrous, smooth, equal, but at times with a well formed bulb, 24-37 x 1.5-2 mm., rarely broader at the bulb. Context white, unchanging, inodorous. Spores 5.8-6.8 x 4.7-6.2 μ (type) and often as large as 6.8-8.2(9) x 6-7.2-(7.5) μ in var. *aconquijensis* (see below), ovoid, short-ellipsoid, or subglobose, stramineous, smooth. Hymenium: Basidia 4-spored. Cheilocystidia vesiculose or like the pleurocystidia, same size as pleurocystidia, hyaline, smooth, often very crowded at the edges. Pleurocystidia (20)-37-50 x 11-18-(28) μ , subampullaceous, with very broad neck which narrows gradually upwards to a very broadly rounded tip, hyaline, smooth. Hyphae without clamp connections, hyaline in KOH and NH₄OH. Covering layer of pileus: Epicutis consisting of spherocysts which form a sometimes intermittent layer, few slightly ellipsoid or otherwise off spheric, all hyaline, easily collapsing, e. gr. 17 μ diam.; hypodermium—a cutis, its hyphae filamentous, hyaline.

On dicotyledonous tree trunks in subtropical forest (var. *aconquijensis*) and in more temperate sub-xerophytic woods (var. *bruchii*) fruiting from late summer until early fall.

This may be subdivided into two varieties:

Var. BRUCHII;—Fig. 34 B.

Spores 5.8-6.8 x 4.7-6.2 μ . Mountain temperate sub-xerophytic woods.

ARGENTINA: Prov. Cordoba, Alta Gracia, C. Brush no. 225, 16-II-1925. (LPS, typus).

Var. *aconquijensis* Sing., var. nov. (ad int.);—Fig. 34 A.

Spores 6.8-8.2-(9) x 6-7.2-(7.5) μ . Mountain subtropical forest.

ARGENTINA: Prov. Tucumán, Sierra San Javier Singer T 972, 16-IV-1950. (LIL). T 1196, 13-II-1951. (LIL).

Survey of the Subspecies and Varieties of

P. laetifrons and *P. chrysophlebius*

- A. Pileus distinctly bright red at least before bleaching, or at least deep reddish orange ("cadmium orange" R.—*tile r.* M&P).
 - B. Some cells of the epicutis orange cinnamon to pale cinnamon; pileus with darker spots (s.l.). Yungas.....*P. laetifrons* var. *bolivianus*
 - B. All cells of epicutis hyaline or pale yellowish; pileus unicolorous
 - C₁. Spores 4.5–5.5 x 4.3–5.3 μ ; pileus orange red, 3–12 mm. Cuba....
P. laetifrons var. *laetifrons*
 - C₂. Spores 5–6 μ in diameter; pileus slightly larger with long "cadmium orange" striae on yellow ground. Trinidad.....
Probably form of var. *laetifrons*
 - C₃. Spores 5.7–6.8–(7.5) x 5.3–6 μ ; pileus 10–15 mm. broad, bright red, with short-striate or short-sulcate margin, Florida.....
P. laetifrons var. *floridae*
- A. Pileus bright yellow to deep golden yellow.
 - D. Many spores almost geometrically globose; stipe entirely yellow. Center of pileus smooth, dry rugulose. Tropical species (Yungas).
 - E. Cystidia ampullaceous with rather long neck. Orange striae on margin not visible. Bolivia.....*P. chrysophlebius* var. *sublaevigatus*
 - E. Cystidia at the most short and broad mucronate. Orange striae on yellow margin visible. Trinidad (see C₂).
 - D. Spores all at least subglobose i.e. at least $\frac{1}{2}$ μ longer than broad. Stipe often hyaline or pallid or white above. Pileus on disc often either quite smooth, or more distinctly rugose or venose in wet condition.
 - F. Pileus on disc smooth or very slightly rugulose in a few cases South American forms.
 - G. Spores 5.8–6.8 x 4.7–6.2 μ . Southernmost form (Cordoba)
P. chrysophlebius ssp. *bruchii* var. *bruchii*
 - G. Spores larger. Form of the Selva Tucumana.....
P. chrysophlebius ssp. *bruchii* var. *aconquijensis*
 - F. Pileus on disc mostly distinctly rugose or venose even when moist and fresh. North American forms.¹¹.....
P. chrysophlebius ssp. *chrysophlebius*

STIRPS GLOBIGER

51. PLUTEUS GLOBIGER Sing. Lilloa 25: 266. 1951 (1952),—Fig. 35.

Pileus some shade of brown (but never with a gray shade) over more or less visible yellow ground, the brown typically fuscous brown to spadiceous (*Madrid*, M&P 15–C–10, also 15–E/H–12), the yellow varying from *brass* (11–L–6) to 9 L–2/4, 10–K/L–5, or 10–J–3 (M&P), the brown sometimes very bright and rich in younger specimens which are more strongly granular or scurfy, reaching about *persimmon* (5/6–E–12 M&P), dry, either quite smooth or in the marginal portion up to $\frac{2}{3}$ of the radius finely sulcate or sulcate (but not constantly so, not even in most older specimens, and typically only short-sulcate), and/or with rugose-venose surface on middle portion or scrobiculate, but in some forms quite even in the center, sometimes irregularly (never radially) rimulose or rivulose, convex to convex-hemispherical, later subapplanate or even with slightly depressed center, non-umbonate, subumbonate, or distinctly umbonate, 8–26 mm. broad, typically

¹¹It is possible that the North American type subspecies can be subdivided in several taxons, but I am familiar only with the type of *Agaricus chrysophlebius* from the Southeast and the common species generally called *P. abmirabilis* in North American literature.

10-26 mm. diam. Lamellae yellow (M&P: 9-K/L-4; 10-K/L-5) but reaching *golden glow* to *deep chrome* (9-L-6/7), or *autueil* (11-C-7), eventually pale citrine-pink, subventricose to ventricose, broad to extremely broad, close, free. Stipe yellow' (*Pinard* y. 9-J-2; *sunflower* 9-L-4; *ta ming* 10-L-6; *amber* y. 10-J-3; *jonquil* 9-J-5, eventually *lemon chrome* 9-L-2), paler or gradually white toward apex, sometimes paler innately silky-striate, and frequently with minute silky fibrils which are innate and shiny, sometimes longitudinally somewhat striate, glabrous, stuffed, eventually hollow, equal or with tapering apex or with bulbous base, sometimes eccentric, 10-38 x 1-3 mm., at the base sometimes reaching 6.5 mm. in diam. Context yellowish or yellow, but in the interior of the pileus and stipe at first white, inodorous. Spores 4.5-7.5 x 4.1-7.2 μ , either all nearly geometrically globose, or at least a large percentage of the spores truly globose, and the rest subglobose smooth, subhyaline to pinkish stramineous. Hymenium: Basidia 23-30 x 7.5-9.3 μ , 4-spored, variable in shape, from clavate to ventricose. Cheilocystidia very numerous, varying from clavate-vesiculose to vesiculose-ampullaceous with short or broadly rounded thick neck, also ovoid-vesiculose or cylindric-vesiculose or plainly saccate, 16-70 x 6.5-41 μ , many filled with brownish intracellular dissolved pigment, other hyaline at times all hyaline except perhaps those closest to the margin of the pileus. Pleurocystidia of the same size as the cheilocystidia and likewise clavate-vesiculose, vesiculose-ampullaceous, vesiculose-cylindric or broadly ventricose below gradually slightly attenuated to a broadly rounded broad or piriform tip, hyaline, rarely a few colored as the cheilocystidia, thin-walled and smooth, more scattered than the cheilocystidia. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of a single layer of spherocysts which are smooth, globose or subglobose-pedicellate, hyaline and alternating with pigmented ones; pigment intracellular, usually dissolved but typically indistinctly to distinctly locally condensed which is more clearly visible if the pigment is abundant (and then, in those specimens, the cheilocystidia are also frequently filled with pigmented sap).

On various trunks of trees on fallen branches in subtropical and tropical-montane forest, also in montane forest of the conifer zone on *Phoebe porphyria*, *Boehmeria caudata*, *Piptadenia macrocarpa*, and *Podocarpus parlatorei*, fruiting in late spring, summer and fall, until May.

BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Yariza, Singer B 1218 16-II-1956. (LIL). ARGENTINA: Prov. Tucumán, Parque Aconquija. Singer T 351, 1-IV-1949 (LIL). T 553, 8-V-1949 (LIL). Anta Muerta, Singer T 408, 10-IV-1949 (LIL). T 803, 2-I-1950 (LIL). T 973, 16-IV-1950 (LIL, typus). Santa Rosa, Singer T 1055, 17-XII-1955 (LIL). Taficillo, 1800 m. alt. Singer T 1388, 4-III-1951 (LIL). T 1395, (LIL).

The collection from the Bolivian Yungas and the two collections on *Podocarpus* have epicuticular elements which are, in their majority not very abundantly pigmented (many hyaline cells and the other with indistinct pigment condensations). It might be possible to separate these collections from the type, but the Bolivian collection has a somewhat different color of the pileus.

The type and some other collections from the upper zone of the subtropical forest on dicotyledonous wood are distinctly rugose or venose or scrobiculate while the Bolivian form as well as the montane collection on *Podocarpus* were smooth. However, other Argentine collections were also smooth or nearly so.

The color is typically fuscous brown. A brighter brown, orange or deep gold brown color was observed on one collection from the upper subtropical forest zone on dicot wood (*Phoebe*) and on the Bolivian collection. However, the first of the two was scrobiculate, the latter smooth.

Since we do thus not observe enough hiatus between these forms and sufficient consistency in their characters, it is hardly desirable to create taxa for them at present, but an enumeration of the character combinations observed may be useful:

(1) Type form: Fuscous brown with yellow, strongly venose-rugose, short sulcate, 13-22 mm. broad; many cheilocystidia brown; epicuticular pigment often distinctly condensed. On dicot trunk in upper subtropical zone. (Here T 973).

(2) Bright orange brown mixed with brass color, strongly scrobiculate. Yellow pigment abundant. Few cheilocystidia pigmented. On dicot trunk in upper subtropical zone (T 803).

(3) Bright orange brown, but smooth. On dicot wood in tropical montane forest. Cheilo- and pleurocystidia all hyaline. (B 1218).

(4) Fuscous-spadiceous or fuscous brown with yellow, seemingly or actually smooth (often heavily granular). Cheilocystidia often pigmented. On dicot trunk in upper and lower subtropical zone (T 351, T 408, T 553, T 1055).

(5) Fuscous-spadiceous to fuscous brown with yellow, smooth. Cheilocystidia and pleurocystidia all hyaline. Pileus sometimes very small. On coniferous wood in the mountain zone. (T 1388, T 1395).

51. **Pluteus xanthopus** Sing., spec. nov.,—Fig. 36.

A *P. globigero* differt colore grisascente pilei, margine pellucide striatulo, lamellis cremeis. Elementis epicuticularibus succo homoganeo-pigmentato (pigmento aequaliter dissoluto) repletis. Ad truncos dicotyledoneos, in silva subtropicali.

Pileus a dusky grayish brown to olive gray, or entirely olive gray, the olive gray equalling *light stone* M&P 12-J-5, the brown being very different from the fuscous brown or bright orange brown of the preceding species but corresponding to *new cocoa* (M&P 7-A-10), with transparently striatulate and at the same time sulcate margin, subglabrous, not distinctly fibrillose anywhere, not rimose or rivulose, but with a distinct darker colored venose rugosity at least in the center in dry or dried condition (not clearly visible when wet), convex, then applanate, not umbonate, about 18 mm. broad. Lamellae cream colored, edge likewise cream colored, or pallid, later all pink, moderately broad to rather broad, close, free. Stipe *lemon yellow* (M&P 10-K-3), smooth, glabrous, equal, with a distinct small bulb, 21 x 1.5 mm., base often 2-3 mm. broad. Basal mycelium often abundant, white. Context partly slightly yellowish, otherwise white, unchanging, inodorous.

Spores (3.8)–5.5–6.3(7) x (3.8)–5.5–6.1 μ , usually almost geometrically globose, fewer spores subglobose (such as $\frac{6.5-7}{6-6.1}$ μ), especially the larger ones, smooth, stramineous, pink. Hymenium: Basidia 24.8–27.5 x 7.2–8.2 μ , 4-spored. Cheilocystidia more variable than the pleurocystidia, either like those or subcylindrical, broadly fusoid with broadly rounded tip, or clavate, also more variable in size, hyaline, at times with the wall slightly thickened at the tip, 37–78 x 9–33 μ . Pleurocystidia characteristically broadly ventricose to ventricose-vesiculose-mucronate or ampullaceous with a very short and broad and obtuse mucro or neck (the latter about 11 μ in diam.), tapering upwards, hyaline all over and consistently, 56–75 x 17–30 μ . Hyphae without clamp connections. Subhymenium strictly large-cellular (as in some Secotiaceae), hyaline. Hymenophoral trama inverse. Covering layer of pileus: Epicutis consisting of a layer of spherocysts which are all isodiametric or subisodiametric, never elongated and cystidioid, always with fuscous or light fuscous pigment; pigment intracellular, completely and evenly dissolved. Hypodermium consisting of filamentous hyphae which form a cutis, some brown, most hyaline.

On a rotten dead dicot trunk (lauraceous, leguminous, or myrtaceous) in subtropical forest, 1100 m. alt., fruiting in summer, solitary.

ARGENTINA: Prov. Tucumán, San Javier (Ciudad Universitaria), Singer T 2916, 28-I-1957 (LIL, typus).

This species is closely related to the preceding one, but much rarer in the Tucumán region. It has the appearance of *P. lutescens*, but the globose spores define its position in stirps Globiger.

STIRPS LUTESCENS

This differs from the preceding stirps in more elongated spores. In contrast to the stirps Globiger which seems to be essentially subtropical-tropical-montane, the stirps Lutescens is temperate. Its occurrence in South America is probably due to human influence and it is quite possible that *P. lutescens* never was a native element.

53. *PLUTEUS LUTESCENS* (Fr.) Bres., Icon. Mycol. 11: pl. 544. 1929.

Agaricus nanus var. *lutescens* Fr., Epicrisis p. 141. 1836.

Pluteus nanus var. *lutescens* (Fr.) Karst. Hattsv. I, 256. 1879.

Pluteus nanus ssp. *lutescens* (Fr.) Konr. & Maubl. 6: 55. 1924–37.

Pileus *Bracken* (M&P) to more umber, often with some yellowish lights, macroscopically glabrous but under binocular showing a very fine granular or rivulose discontinuity, smooth or with transparently striate margin (5)–14–40 mm., sec. Kühner & Romagnesi up to 60 mm. broad. Lamellae at first paler or brighter lemon yellow, then pink, broad, more or less ventricose, moderately close to close, free. Stipe *lemon y.* to *citrin y.* or *Brown Sugar*, always yellow at first, slightly tapering upward, or equal with slightly subbulbous base, glabrous or subglabrous, 15–40 x 1.5–3.5 mm. Context white or pale yellow in pileus, concolorous with surface in stipe, inodorous. Spores (5.8)–6–6.8(7.3) x (4.3)–5–6–(6.5) μ , subglobose. Hymenium: Basidia 21.5–27 x 7–7.8 μ , 4-spored. Cystidia 35–53(75) x 16–29 μ , ventricose-vesi-

culose or broadly cylindrical, usually thickest in middle, always hyaline. Cheilocystidia similar, but some smaller and more constantly vesiculose.

Hyphae of hypodermium hyaline. All hyphae without clamp connections. Covering layer of pileus: Epicutis of pileus consisting of chains of short cells, the terminal cell usually subisodiametric or isodiametric, obpiriform-globose, with light brown to fuscous intracellular pigment (often with pigment condensations), but some cells hyaline, $29-47 \times (16)-23-36 \mu$.

On sandy soil and on rotten wood of coniferous and frondose trees, fruiting in summer and fall.

CAUCASUS: Saken, August 1928, Singer (W), on *Fagus orientalis*; U.S.A.: Mich., Mackinaw City Hardwoods, 6-VII-1953, Singer N 406, (F); Calif., Muir Woods, near San Francisco, on redwood stump, 1-V-1953, Singer (F).

This was also described from Argentina, Prov. Buenos Aires, Castelar, July 1948, by A. Martinez (Lilloa **21**, 45-46, 1949). The description refers to the lamellae as initially white which is also occasionally indicated from European material and seems to occur rather frequently. Our material was always yellow-gilled from the start. Numerous European collections by the author coincide with the data given above, but were not preserved.

STIRPS LUCTUOSUS

54. *PLUTEUS LUCTUOSUS* Boud., Bull. Soc. Mycol. Fr. **21**: 70. 1950; —Trans. Brit. Mycol. Soc. **39**, fig. 54. 1956.

Pileus fuscous, glabrous, naked, smooth to rugulose, with finely sulcate margin, convex with applanate center, 20-21 mm. broad. Lamellae pink, with fuscous edge, broad, subclose, free. Stipe whitish and glabrous in the upper half, fuscous fibrillose all over the lower half, the very base white pubescent from the basal mycelium, solid, later becoming narrowly stuffed to hollow, subequal, $22-30 \times 2-2.5$ mm., base up to 3 mm. broad in some specimens. Context white, inodorous. Spores $6-8.1 \times 5.3-7.2 \mu$, subglobose to almost short-ellipsoid, smooth, stramineous. Hymenium: Basidia $20-21 \times 7-8 \mu$, almost claviform but attenuate at the very tip, 4-spored. Cheilocystidia making the edge subheteromorphous, crowded, otherwise like

the pleurocystidia; cystidia $19-55 \times 9.5-34 \mu$, some as short as $\frac{19-50}{16-34} \mu$ some as elongated as $\frac{19-55}{9.5-17} \mu$ smooth and entire, ventricose-ampul-

laceous, vesiculose-subulate, or ellipsoid-vesiculose to subglobose, with fuscous cell sap, at least in the majority both at and away from the edge. Hyphae without clamp connections. Covering layer of the pileus: Epicutis of the pileus cellular, cells filled with fuscous cell sap.

On rotten wood in sub-xerophytic forest, fruiting in summer.

ARGENTINA: Prov. Tucumán, 10 km. south of Tapia, R. Singer T 1234, 17-II-1951. (LIL).

This species, originally described from France, is rare in South America, and has been found only once thus far. However, in spite of some very slight discrepancies, the descriptions agree too well to consider our material anything but *P. luctuosus*, at least as long as the

study of a single population in Argentina, and very few populations in Europe provide too poor data for the study of the variability of the species.

P. luctuosus is here described exclusively from one good collection from Argentina. A comparison with the original description shows that the South American form differs in the limitation of the dark fibrils of the stipe to the lower half of the latter, and the habitat which is on rotten wood here, and on soil in France.

Kühner & Romagnesi (1953) think that *P. marginatus* (Quél.) Bres. is specifically identical¹², although Romagnesi (in Kühner & Romagnesi, 1956) seems to reserve all responsibility for this approximation for Kühner, and expresses his doubts about the specific identity and nomenclature adopted by both authors in 1953. Is *P. marginatus* really a variety of *P. luctuosus*? I do not have the slightest doubt about the affinity of these species. They belong most certainly in the same stirps (*Luctuosus*). But the difference in color of the pileus and the lack of dark fibrils on the stipe of *P. marginatus*, and, microscopically, the size of the cystidia and the type of pigmentation would suggest that the species should not be considered varieties. There is a strange discrepancy between the description of the color of the pileus as given in the original diagnosis of *P. phlebophorus* var. *marginatus* Quél. and the color indicated by Kühner & Romagnesi and illustrated by Bresadola, but this observation without personal knowledge of the species as it occurs in Europe, may not have much significance. However this be, *P. luctuosus* can never be accepted as a variety of *P. marginatus*.

55. *Pluteus beniensis* Sing., spec. nov.,—Fig. 37.

Pileo fusco, glabro, centro punctato-velutino, margine sulcato, 22 mm. lato. Lamellis roseis. Stipite albo, griseo-fibrilloso ad basin, 23 x 2.5 mm. Sporis 4.8–7 x 4.4–6.4 μ , globosis vel subglobosis. Cystidiis hyalinis vel fuscis, praesentia cystidiorum fuscorum constante. Epicute cellulari. Ad lignum.

Pileus fuscous (*bark*, M&P 8-C-11), glabrous except on the disc which is slightly uneven from a velutinous punctation, sulcate on the marginal third, convex with depressed center when mature, obtuse, 22 mm. broad. Lamellae pink, with concolorous (pink) edge, broad, close, free. Stipe white except for the lower portion which is grayish fibrillose, slightly tapering upward, 23 x 2.5 mm., apex 1.5 mm. broad. Context white, inodorous. Spores 4.8–7 x 4.4–6.4 μ , varying from almost geometrically globose to subglobose, the smaller spores predominantly globose, the larger ones predominantly subglobose, e. gr. 4.8–6–6.5–6.9–7 μ , smooth, stramineous. Hymenium: Basidia 25.5 x 4.4–5.6–6–6.4 μ .

¹²As pointed out by Romagnesi himself, the proposed combination "*Pluteus marginatus* (Quél.) Kühner & Romagnesi var. *luctuosus* Boud." is merely another unfortunate example for the complete disregard of nomenclatorial rules shown by the authors of this otherwise excellent and valuable book. It should not be necessary to show (1) that Bresadola is the author who first proposed *P. marginatus* with the specific status now apparently generally admitted, (2) that *P. luctuosus* has priority, as a specific name, over *P. marginatus* and (3) that Kühner & Romagnesi transferred it to varietal status under *P. marginatus*.

9 μ , ampullaceous, 4-spored. Cheilocystidia and pleurocystidia practically identical; cystidia 31.5–44 x 18–24 μ , rather variable, ellipsoid-ventricose-vesiculose, vesiculose-subulate but broadly rounded, ventricose below and attenuate above to a rounded tip, ampullaceous, etc., smooth and entire, thin-walled, in about equal proportion either hyaline or filled with a dissolved intracellular fuscous pigment. Hyphae without clamp connections. Hymenophoral trama and trama of the pileus hyaline. Covering layer of the pileus: Epicutis consisting of a single layer of globose and often pedicellate cells, rarely apiculate above, forming a subhymeniform stratum together with some more elongated (but never more than twice as long as broad!) elements which are not dermatocystidia and do not make the epicutis dimorphic inasmuch as all degrees of transitions exist in every section; the more elongated elements obpiriform to ellipsoid-vesiculose; pigment of all elements of the epicutis intracellular, evenly dissolved, without noticeable condensations, fuscous.

On dead dicotyledonous wood in tropical rain forest.

BOLIVIA: Oriente (Beni): Vaca Diez, Riberalta, 30–III–1956, Singer B 2346 (LIL, typus).

This differs from *P. poliocnemis* Kühner in being smaller, having smaller spores, and some pleurocystidia. It differs from the European representatives of the stirps *Nanus* in having colored cystidia, and from the preceding species and its allies in the absence of a macroscopically visible discoloured edge as well as by much rounder spores.

56. *PLUTEUS RIOGRANDENSIS* Sing., Lilloa 26: 116, 1953,—Fig. 38.

Pileus fuscous, glabrous, neither finely rimulose nor rivulose or rimose or granular, smooth (not venose or rugose) except for the margin which is short sulcate (not pectinate), convex, obtuse, 17–18 mm. broad. Lamellae pink with pink edge, broad, ventricose, free. Stipe white, at base slightly watery grayish, smooth glabrous, slightly tapering upwards, 20–22 x 3 (at base), 1.5 mm. (at apex). Context white, unchanging, inodorous. Spores 5.5–7.5 x 5–7.3 μ , mostly about 0.5–0.7 μ longer than broad, but varying in form from as globose as 5.5 x 5.5 μ to as elongated as 7.2 x 5.7 μ , smooth, stramineous. Hymenium: Basidia 26 x 9 μ , ventricose, 4-spored. Cheilocystidia in shape like the pleurocystidia, also in size but rather crowded, and many of them filled with a fuscous cell sap, the others hyaline; pleurocystidia 20–46.7 x 9.5–30 μ , sometimes vesiculose, sometimes ventricose-vesiculose, broader below or in middle, always very broadly rounded above, often pedicellate, hyaline, or those nearer the edge sometimes filled with a fuscous cell sap. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of cellular elements, subglobose to obpiriform, very few narrower and slightly mucronate, pigment fuscous vacuolar, the pigment condensations undoubtedly present but not very strongly contrasting.

On naked earth in a deep ditch in the forest, fruiting in spring.

BRAZIL: Rio Grande do Sul, São Leopoldo. Singer B 31, 31–X–1951 (LIL, typus).

This species differs from the preceding, which is closest, in the presence of pigment condensations in the epicuticular elements in the

more glabrous and even pileus and the habitat on earth rather than on wood. *Pluteus riograndensis* reminds one in several ways of *P. iguazuensis* which differs in hyaline cystidia.

57. *PLUTEUS RIMOSO-AFFINIS* Sing., Trans. Brit. Mycol. Soc. **39**: 211. 1956, fig. *ibid.* 58-59.

Pileus fuscous to brown (*Chukker Brown* to *Teak Wood*, Santos, *English Oak*, M&P), all over or only in the center, the disc or reticulation sometimes reaching *Cordovan* (M&P), the margin when drying (still fresh) usually cracking minutely to become rivulose and in that zone more gray (*Goat*, *Log Cabin* M&P), sometimes even with radial coarse rimose stripes, here and in the rivulose zone the white context showing, otherwise extremely finely punctulate dotted (under binocular), macroscopically glabrous in central portion, with very rarely smooth to rugose-uneven and mostly reticulate-venose disc, with smooth to slightly venose margin, convex, then flattened and sometimes concave in age, obtuse or subumbonate, (18)28-78 mm. broad. Lamellae white with grayish-pallid edges, soon pink with pallid edges, but in a zone about 5 mm. (or less) from the rim of the margin showing pale fuscous-gray edges under binocular, especially when dried, close to crowded, about 5-6 mm. broad, free. Stipe entirely white, longitudinally sulcate, glabrous, equal, or very slightly tapering upwards but with a more or less conspicuous basal bulb (which is 7-13 mm. broad), otherwise 33-69 x 4-10 mm.; mycelium white. Context white, unchanging, inodorous. Spores 5.5-6.6 x 5-6 μ , from print 6-6.6 x 5.3-6 μ , not geometrically globose but not elongate either, usually about 0.5-0.6 μ longer than broad. Hymenium: Basidia about 21.5 x 7.3 μ , 4-spored. Cheilocystidia making the edge flocculose (binocular) and heteromorphous, more versiform than the pleurocystidia, varying from hyaline to light brown (near margin of pileus the majority colored, otherwise majority hyaline, but colored cystidia present down to the bases of the lamellae), smooth and thin-walled, ventricose to obpiriform-vesiculose, rarely submucronate or subcapitate, 24-93 x 17-48 μ . Pleurocystidia obpiriform and often pedicellate, much like the epicuticular cells but all hyaline, smooth, thin-walled, moderately numerous, 40-65 x 18.7-33.3 μ . Hyphae without clamp connections. Covering layer: Epicutis of pileus cellular, cells obpiriform and often pedicellate, with fuscous intracellular dissolved or brown intracellular colloiddally condensed pigment in the same preparation, few hyaline, smooth, 26-57.5 x 16-39 μ .

On rich earth underneath a rotting palm trunk, and on palm trunk, shady place, gregarious to fasciculate.

ARGENTINA: Prov. Tucumán, Singer T 2011, 19-XI-1954, type (LIL); T 2012, 25-XI-1954, paratype (LIL); 28-I-1955, etc.

STIRPS ROSEOCANDIDUS

This almost pigment-free group exists in the Northern as well as the Southern Hemisphere. The South American representative is:

58. *PLUTEUS HOLOLEUCUS* Sing., Trans. Brit. Mycol. Soc. **39**: 200. 1956,—Fig. 39.

Pileus pure white, glabrous, but micaceous in dry condition, strongly reticulate from raised subradiating lines all over, more rarely only in

the center, or only distinctly rugulose, with more or less sulcate margin when mature, dry, convex, eventually applanate, often somewhat umbonate, 11–28(33) mm. broad. Lamellae white, then pink (including the edges), broad (4.5 mm.) ventricose, close, free. Stipe pure white, very faintly lineate but very distinctly mealy-pruinose, equal, 12–31 x 1.5–3.5(5) mm.; basal mycelium white; some carpophores somewhat eccentric. Context white, unchanging, inodorous. Spores 5.3–7 x 5.3–6 μ , some almost geometrically globose, others more elongate, smooth, stramineous. Hymenium: Basidia 4-spored, 20–23 x 7–7.3 μ . Cheilocystidia ventricose to ventricose-subampullaceous, hyaline, entire, very numerous, 40–50 x 12–15 μ . Pleurocystidia numerous, ampullaceous, fewer ventricose-ampullaceous or ventricose, hyaline, smooth, naked, entire, thin-walled, 33–53 x 12–19.5 μ . Hyphae of the inverse hymenophore hyaline, without clamp connections. Covering layer: Epicutis of the pileus consisting of an epithelium of short elements which are globose to short-clavate-vesiculose, 42–47 x 18–38 μ , smooth, hyaline, basal septum not clamped.

On dicotyledonous trunk in subtropical forest at 1000 m. alt., gregarious.

ARGENTINA: Prov. Tucumán, Ciudad Universitaria, Sierra de San Javier, 31–I–1955, R. Singer T 2105 (LIL).

This species is close to *P. roseocandidus* Atk. and *P. alborugosus* Kühn.

STIRPS PULVERULENTUS

This stirps differs from the preceding in the presence of pigment but is distinguished from stirps *Luctuosus* in the absence of pigment in the cystidia of the lamellae. While it shares these characters with the following stirpes, stirps *Jamaicensis* and stirps *Tucumánus*, the species around *P. pulverulentus* differ from stirps *Jamaicensis* in the presence of a fair percentage of almost geometrically globose spores and from the stirps *Tucumánus* in the presence of a rugulose to venose center of the pileus.

59. *PLUTEUS PULVERULENTUS* Murr., North Amer. Flora **10**: 137. 1917.—Trans. Brit. Mycol. Soc. **39**, fig. 51. 1956.

Pluteus aethalus var. *pulverulentus* (Murr.) Dennis, Bull. Soc. Myc. Fr. **69**: 153. 1953.

Pileus with a color resulting from a mixture between “Saccardo’s umber” and “pinkish buff” (R.) or *English oak* (M&P, 15–A–10), center often very deep sepia brown or fuscous, e. gr. *bark* (M&P, 8–C–11), with at first smooth, later, especially in dry or dried condition, with transparently striate or somewhat or slightly sulcate margin, or remaining quite smooth, never strongly sulcate or pectinate, appearing glabrous or subglabrous but later in dry or dried condition (less so in moist condition) becoming finely pruinose-velutinous or even very finely fibrillose-punctate and rimulose when seen under a lens, fresh indistinctly to strongly and distinctly venose, radiato-rugose, or reticulate-scröbiculate in the center, but in dried condition veins or rugosity always obvious, at least under a lens, but mostly strongly marked macroscopically, campanulate-convex, soon convex and applanate or sometimes slightly depressed around the umbo or papilla, 12–28 mm. broad. Lamellae

white, then pink, including the edge, at first often crowded but at maturity subclose to moderately close, broad, ventricose, free. Stipe white, glabrous, equal or tapering upwards, sometimes slightly bulbous at base, 12–32 x 1–2 mm., basal mycelium fibrillose to floccose-tomentose, white. Context white, unchanging, thin, inodorous. Spores 4–7.2 x 3.6–6.4 μ , either all or at least some nearly isodiametrically globose, the rest subglobose, very variable in size range, (see varieties), smooth, stramineous. Hymenium: Basidia 20.7 x 6.3 μ , 4-spored. Cheilocystidia 15–50 x 14–33 μ , short-clavate to vesiculose, often some mucronate, or else broadly and evenly rounded above, hyaline, without incrustations, rather numerous, almost crowded. Pleurocystidia much like cheilocystidia, 15–49 x 8–25 μ , ventricose and relatively short, or vesiculose to vesiculose-clavate rather numerous, likewise hyaline. Hyphae without clamp connections. Covering layer of pileus: Epicutis consisting of a palisade of globose-pedicellate to obpiriform cells with some short cylindric elements (not cystidioid) occasionally intermixed, the broad cells 35–58 x 22.5–47 μ , very exceptionally in an occasional section of certain caps a dermatocystidium (ampullaceous) present. Hypodermium mainly of repress hyphae but the terminal members (just underneath the epicuticular cells) often ascending or erect, elements irregularly short and broad, mostly cylindric and rather short, small to very small, pigmented; pigment fuscous, with distinct pigment condensation, intracellular.

On very rotten wood of dicotyledonous trees and on wood-containing earth in the denser portions of the subxerophytic Chaco woods and in the hammock portions of Southern Florida forests and all through the West Indies tropical forests; precise area unknown.

This species can be subdivided into two varieties according to spore size:

Var. *PULVERULENTUS*. Spores 4–5.6 μ , percentage of globose spores large. Not observed in South America until now.

Var. *pseudonanus* Sing., var. nov.,—Trans. Brit. Mycol. Soc. **39**, fig. 57. 1956.

Sporis majoribus recedit. Ceterum ut in typo.

All characters as in the description above, but spores always larger than indicated for var. *pulverulentus*: (5) 5.5–7.2 x 5–6.4 μ .

U.S.A.: FLORIDA: Dade Co., Matheson Hammock, R. Singer F 885, 28-IX-1942 (F). Royal Palm State Park F 1307, 27-2-1942 (F). ARGENTINA: Prov. Salta, Burruyacú, R. Singer T 2986, 17-II-1957 (LIL, typus).

The southern form of var. *pseudonanus* Sing. (the type T 2986) is somewhat less, although still distinctly, venose-rugose than are all other collections including those of var. *pulverulentus*. But since this is a quantitative character not correlated with any other character now detectable, I have not seen fit to distinguish T 2986 from the other collections (from Florida) of var. *pseudonanus*, at least as long as the differentiating character cannot be shown to be constant in numerous populations.

60. *Pluteus eliae* Sing., spec. nov.,—Fig. 40.

A *Pluteo pulverulento* differt pigmento elementorum epicuticularium aequaliter vel subaequaliter dissoluto, pileo paulum dilutius, margine pilei magis sulcato, habitatione in ligno silvae pluvialis.

Pileus varying from avellaneous-fuscous and subglabrous to very finely fuscous fibrillose on pallid-rosy ground, and only in center continuously fuscous, with indistinct to distinct rugulosity in the center (in small specimens often indistinct), with distinctly sulcate margin, convex to convex applanate, with a low and obtuse umbo, or on the contrary, with a small central depression, 12–32 mm. broad. Lamellae pink with pink edge, close to subclose, narrow to broad, free. Stipe white all over, glabrous, subequal to tapering upwards, 3–34 x 1.5 mm. Context white, very thin, inodorous. Spores 4.9–6.2 x 4.8–5.9 μ , either all almost geometrically globose, or else a certain number, sometimes the majority, subglobose, the rest being almost geometrically globose, e. gr. $\frac{4.8-5-5.5}{4.8-5-5.5} \mu$ or $\frac{5.4-5.5-5.6-5.6-6-6.2-6.2}{4.7-5-4.8-5.2-5.5-5.5-5.9} \mu$ smooth, stramineous. Hymenium: Basidia 3–4-spored. Cheilocystidia 18–25 x 11–15 μ , numerous, very broadly cylindric to most frequently more or less vesiculose, hyaline. Pleurocystidia perhaps present, not observed. Hyphae without clamp connections. Trama hyaline. Covering layers of the pileus: Epicutis consisting of cells which are globose and often short-pedicellate, without the pedicel measuring 19–50 x 17–48 μ , some more ellipsoid or obpiriform, pigment intracellular and not present in all cells, in many fuscous or umber, evenly dissolved, or very rarely with some indistinct condensations of pigment in a few exceptional cells. Hymenium hyaline, filamentous or almost so.

On wood of dicotyledonous trees, growing singly or fasciculately in the rain forest.

BOLIVIA: Oriente (Dpto. Pando): Prov. Masuripi, Conquista, Singer & E. R. de la Sota¹³ B 2184, 24–III–1956 (LIL). B 2193, 25–III–1956 (LIL, typus).

This species differs from the closely related *P. pulverulentus* in the characters emphasized in the Latin diagnosis. The smaller specimen differs from the holotype in non-fasciculate growth, depressed center and less rugulose disc. However, it seems to be a somewhat poorly developed solitary specimen, and does not give the impression as if it represented a taxonomically separable form.

61. *Pluteus sapiicola* Sing., spec. nov.,—Fig. 41.

A speciebus affinis (*P. pulverulentus*, *P. eliae*) differt pigmento cellularum epicuticularium aequaliter dissoluto, stipite cinereo-lineato, habitatione in *Sapio haematospermo*, pleurocystidiis ampullaceis apice tuniculo praeditis (2.5–3.5 μ in diam.).

Pileus fuscous, venose-rugose, glabrous, with smooth margin, eventually short-sulcate (from extreme margin 1–2 mm. inwards), campanulate-convex, then convex-applanate, at first with very steep extreme margin, umbonate, 25–50 mm. broad. Lamellae pink with pink edge, close, moderately broad, free. Stipe whitish with cinereous

¹³The species is named for the co-collector Sr. Elias Ramón de la Sota.

longitudinal innately-fibrillose stripes, attenuate upwards, 27–44 x 4.6 mm. (at base), 2–4 mm. at apex. Context whitish to sub-concolorous in some parts, unchanging on exposure, thin, inodorous. Spores 5.6–7.2 x 5.5–6.9 μ , varying from almost geometrical globose to subglobose,

e. gr. as globose as $\frac{5.6-5.9-6.9}{5.6-5.7-6.7}$ μ , or as elongated as

$\frac{6-6.2-6.9-6.9-7.2}{5.5-5.5-5.5-6.2-6.8}$ μ , smooth, pinkish, stramineous: Hymenium: Basidia 23–29 x 6.9–8.2 μ , fusoid, ventricose, 4-spored. Cheilocystidia like pleurocystidia, or more versiform (often ventricose-vesiculose, ampullaceous-vesiculose, completely hyaline, 38–49 x 14–20 μ . Pleurocystidia 44–62 x 12.5–19.5 μ , ampullaceous, with thin (2.5–3 μ diameter) cylindric “neck”, or the apex subcapitate (neck 2.5–3.5 μ diameter, capitulum 2.3–4.8 μ diam.), all hyaline, thin-walled, “empty”, with or without an incomplete, thick hyaline resinous incrustation which is very fugacious. Hyphae without clamp connections. Hymenophoral trama inverse, hyaline. Covering layers of pileus: Epicutis a single layer of vesiculose, very short, usually globose-pedicellate, subglobose, or obpiriform cells, up to 45 μ long, e. gr. 23 x 23 μ , with a pedicel of 23 x 2.5 μ , without dermatocystidia, pigment intracellular, evenly dissolved, fuscous, some elements also with thin spiral, hyaline, internal filaments. Hypodermium—a cutis.

On dead rotting trunk of *Sapium haematospermum* in xerophytic-subxerophytic vegetation in a relatively less dry narrow valley under the shade of various trees, gregarious, fruiting in summer.

ARGENTINA: Prov. Salta; Dpto. de Güemes, Quebrada de Yaquiásmé, Singer T 2960, 7–II–1957. (LIL, typus).

This is obviously nearest to *P. pulverulentus* var. *subnanus* Sing. and *P. eliae*. The former, in South America, appears to be adapted to habitats similar to the type locality of *P. sapiicola*. However, the latter is larger, has evenly dissolved pileus pigment, striped stipe and different cystidia. *P. sapiicola* differs from *P. eliae* in the characters emphasized in the key, and probably also in the ampullaceous pleurocystidia with narrow neck.

STIRPS JAMAICENSIS

The stirps Jamaicensis is clearly separated from the following stirps as far as South American species are concerned. As for the European species, it might be more satisfactory to combine both stirps under one, which has been called “Le groupe de *Pluteus nanus*” (Kühner & Romagnesi) in as much as the European species do not seem to have a very constant differentiation of the rugosity of the pileus. However, stirps do not have any taxonomic status as taxa, and I do not see any harm in using a scheme adapted to the South American situation where a pair of groups of related species seem to permit the use of two stirps instead of one. Since *P. satur*, *P. thomsonii*, and *P. phlebophorus* are all three at least sometimes somewhat rugulose, they may perhaps be attached to the stirps Jamaicensis while *P. keissleri* would remain with the stirps Tucumánus.

62. *Pluteus fluminensis* Sing., spec. nov.,—Fig. 42.

Pileo porphyrino-brunneo, vel fuligineo-brunneo, centro venoso, margine rimoso-sulcato vel sulcato, 16–28 mm. lato. Stipite albo. Sporidia 5–6.3 x 4.3–5.3 μ , subglobose. Cystidiis hyalinis. Ad truncum emortuum dicotyledoneum in silva tropicali.

Pileus porphyry brown or deep sepia to fuliginous brown, sometimes with umber margin (*falcon*, M&P 8–J–10, on margin *sunburn*, M&P 7–C–11), generally deep colored, often with much paler margin and an intermediate color zone with rugose or venose center, on margin finely punctate-velvety at least under a lens, mostly becoming rimose along the sulci of the margin but sometimes the latter not corresponding to any radial rimosity and then often becoming indistinct in dried material, dry, convex, then applanate, not umbonate or with a low and very obtuse umbo, eventually concave and subumbonate or not umbonate, 16–28 mm. broad. Lamellae pink, broad to rather narrow, close to subclose, free. Stipe white, glabrous or subglabrous, longer than the diameter of the pileus, slightly or distinctly tapering upwards with or without a small bulb at base, 23–40 x 1.2–3 mm.; basal mycelium tomentose to somewhat strigose, white. Context white, unchanging, thin, fragile, especially in stipe, inodorous. Spores (4.5)–5–6.3–(7) x (4)43–5.3–(5.8) μ , all subglobose, or rarely a few piriform, never truly globose, smooth, stramineous. Hymenium: Basidia 27–27.5 x 7–7.2 μ , 4-spored. Cheilocystidia either all like the pleurocystidia or somewhat smaller, very crowded, all hyaline. Pleurocystidia 33–66 x 14.5–41 μ , vesiculose-saccate to ellipsoid-subclaviform, ventricose-subvesiculose, with or without a pedicel, hyaline, thin-walled, without incrustation without differentiated contents, moderately numerous to scattered. Hyphae without clamp connections. Covering layers: Epicutis of pileus consisting of obpiriform, globose to subglobose (often pedicellate) cells, 13–55 x 10–35 μ , filled with fuscous intracellular pigment, this pigment often locally condensed in colloid pigment bodies. Base of stipe without any pigmented hyphae.

On rotting and rotten dicotyledonous trunks and logs in tropical coastal and tropical mountain forest, also in "low hammock" vegetation, fruiting in the spring rainy season in Eastern Brazil and in the summer rainy season in Bolivia and Florida.

BRAZIL: Rio de Janeiro. Angra dos Reis. Singer B 432, 31–IX–1952 (F, typus). BOLIVIA: Dpto. La Paz: Prov. Nor-Yungas, Rio Yariza. Singer B 1215, 16–II–1956 (LIL, paratypus). U.S.A.: FLORIDA: Highlands Co., Highlands Hammock State Park, Singer F 392, 25–VIII–1942 (F).

The only difference between the type and the paratypus is the rimosity, following the sulci in the type collection and absent in the paratypus. I do not know whether this indicates an earlier stage of development in the Bolivian collection or an extreme of variability in this regard.

63. *PLUTEUS JAMAICENSIS* Murr., *Mycologia* **3**: 278. 1911,—Fig. 43. *Pluteus aethalus* var. *jamaicensis* (Murr.) Dennis, *Bull. Soc. Mycol. Fr.* **69**: 153. 1953.

Pileus at first usually deep brown or olive brown (*Isabella* M&P 13-K-7) in center, paler toward margin (e. gr. *putty*, M&P 11-B-2) and reaching dirty white at extreme margin in some collections, paler in age, rugose in the center, sulcate over up to 6 mm. from margin inward or more rarely smooth in mature specimens, outside the rugose center glabrous to subglabrous but eventually tending to become slightly rimulose along the sulci and sometimes crustose-areolate, dry, convex, eventually applanate, obtuse, 20–30 mm. broad. Lamellae white then pink with white, then pink edge, close or subclose, broad, ventricose in old specimens, sometimes crisp, free. Stipe white, glabrous, with broadened base and sometimes also enlarged at the apex, generally tapering upwards, solid, often curved, 20–32 x 2–4.5 mm. apex 1–1.5 mm. broad; basal tomentum white. Context white, unchanging, fleshy, rather fragile, inodorous. Spores 5.5–6.8 x 5–6.2 μ , subglobose, not truly globose, smooth, pale pinkish stramineous. Hymenium: Basidia 4-spored. Cheilocystidia and pleurocystidia rather similar, the latter more scattered, all hyaline, thin-walled, vesiculose, subampullaceous-vesiculose, or ampullaceous, 24–30 x 8.7–13 μ . Covering layer of pileus: Epicutis cellular, cells with evenly dissolved brownish pigment.

On rotten wood in subtropical forest.

JAMAICA: Casteleton Gardens, Earle (NY, typus). ARGENTINA: Prov. Tucumán, Parque Aconquija, Singer T 274, 24-III-1949 (LIL).

The South American specimen agrees with the type in everything except a slight olive tinge (which may not be constant) rather than the deep brown color indicated by Earle. The margin appears to be sulcate in most of the specimens of the type, a condition not mentioned by Earle. Since many cystidia have collapsed, it is difficult to state whether the more ampullaceous cystidia of the type represent the rule or rather the exception. All together, the differences do not amount to enough to propose a separate taxon for the South American collection at the present time.

Further observations will show whether the relation between *P. jamaicensis* and *P. fluminensis* is comparable to that between *Pycnoporus cinnabarinus* (Jacqu. ex Fr.) Karst. and *Pycnoporus sanguineus* (L. ex Fr.) Murr., and whether there are transitions where the areas touch. If so, the status of subspecies might be considered for *Pluteus fluminensis*.

STIRPS TUCUMANUS

This stirps differs from the preceding one in smooth center.

64. *PLUTEUS TUCUMANUS* Sing., in Sing. & Digilio, *Lilloa* **25**: 269. 1951 (1952);—*Trans. Brit. Mycol. Soc.* **39**, fig. 65. 1956.

Pileus fuscous (M&P 8-J-12) with the margin radiately sulcate and split, finely pruinose all over, semiglobose, appendiculate-crenate at the margin, 9–15 mm. broad. Lamellae pink, close, broad, free. Stipe

white, finely mealy, 16–18 x 1–1.5 mm. Context white, unchanging, inodorous. Spores 3.8–5.5 x 2.7–3.8 μ , ellipsoid, smooth, stramineous. Hymenium: Basidia 27 x 7.5 μ , fusoid-ventricose-ampullaceous, 4-spored. Cystidia 42.5 x 15.7 μ , ventricose, broadly rounded above, scattered, hyaline. Hyphae without clamp connections. Hymenophoral trama inverse. Covering layer of pileus: Epicutis consisting of obpiriform or subglobose-pedicellate cells, reaching 42 μ long (with pedicel) and having 11–25 μ in diameter, forming a subhymeniform layer, pigment intracellular, dissolved but with amorphous colloid condensations.

On an old dicotyledonous trunk in subtropical forest, fruiting in summer.

ARGENTINA: Prov. Tucumán, Rio de los Sosas. Singer T 921, 18-I-1950. (LIL, holotypus, MICH, syntypus).

This is apparently rare, but quite different from other species, especially by the very small spores and the condensations of the pigment.

65. **Pluteus fallax** Sing., spec. nov.,—Fig. 44.

Pileo fusco, rimoso, pruinoso-subgranulari, levi, 10–21 mm. lato. Lamellis haud atromarginatis. Stipite albo, glabro. Sporis 5–6.8 x 4–6 μ . Cystidiis hyalinis, mucronato-ventricosus, vel ventricosus. Pigmento epicuticulari aequaliter dissoluto. Ad lignum emortuum, in silva subtropicali.

Pileus fuscous to light sordid fuscous e. gr. *Madrid* (M&P, 15-C-10), center sometimes slightly darker, margin or entire surface sometimes somewhat paler, at first glabrous or subglabrous, and sometimes subhygrophanous (whitish-umber when dry-faded) then slightly pruinose-subgranular and soon gradually becoming more and more radially rimose like *Inocybe fastigiata*, in eccentric caps also often rimose on one side and with entire cuticle on the other, not or not distinctly sulcate, convex, typically without, but sometimes also with a small umbo, 10–21 mm. broad. Lamellae white with white edge, eventually becoming pink with pink edge, close, broad, free. Stipe white or whitish, glabrous or appressedly silky-longitudinally-striatulate, tapering upwards, occasionally somewhat eccentric, 17–31 x 1.5–2.5 mm. apex 1–2 mm. broad. Context white, whitish, unchanging, thin, inodorous. Spores 5–6.8 x 4–6 μ , subglobose, smooth, stramineous. Hymenium: Cheilocystidia 28–47 x 11–17 μ , subellipsoid-vesiculose to broadly clavate-subvesiculose, more rarely ventricose below and very broad, attenuate upwards to a very broadly rounded tip, or obtusely mucronate, hyaline smooth, thin-walled, crowded. Pleurocystidia of the same size and shape, or else broadly rhombic in outline but with broadly rounded tip, also hyaline and thin-walled, but rather scattered to rare. Hyphae without clamp connections; trama hyaline. Covering layer of pileus: Epicutis consisting of cells which are globose to short ellipsoid, often pedicellate, 31–48 x 27–35 μ , more rarely smaller, filled with evenly dissolved brown pigment.

On dead dicotyledonous trunks and logs rotting in subtropical forest, fruiting in spring and fall (spring rainy season of southeastern Brazil and end of rainy season in Tucumán).

BRAZIL: Rio Grande do Sul: Est. São Salvador. Singer B 110,

9-XI-1951 (LIL). ARGENTINA: Prov. Tucumán, Parque Aconquija, Singer T 272, 24-III-1949 (LIL, typus).

This was formerly considered identical with *P. tucumanus* respectively *P. umbrinoalbidus*. However, a careful reexamination and new evaluation of the anatomical characters seem to indicate that the former para-types of these species are different from the respective holotypes and apparently conspecific with each other. The differences between the two collections are small: The type is deeper fuscous and more obtuse than the Brazilian collection.

66. *PLUTEUS IGUAZUENSIS* Sing., Trans. Brit. Mycol. Soc. **39**: 201. 1956.—Trans. Brit. Mycol. Soc. **39**, fig. 51. 1956.

Pileus fuscous, Santos, dark beaver (M&P 15-A-9), glabrous or subglabrous, smooth in the center, sulcate over the outer half of the radius, when in dry condition almost pectinate-plicate, but not rimose, convex, then applanate, 20 mm. broad. Lamellae white, with white edge, then pink, ventricose, free. Stipe white except for the very base which is concolorous with the pileus, glabrous, faintly longitudinally striatulate, slightly thickened at apex and base, otherwise equal or subequal, 22 x 1.5 mm. Context white, unchanging, inodorous. Spores 5.8-6.2 x 5.1-5.5 μ , subglobose, smooth, stramineous. Hymenium: Basidia 4-spored. Cheilocystidia e. gr. 37 x 15 μ , ventricose below and gradually attenuate to a very broadly rounded apex, or ventricose-vesiculose, hyaline, smooth, thin-walled, moderately numerous (or perhaps early collapsing). Pleurocystidia like cheilocystidia, also hyaline, scattered. Covering layer of pileus: Epicutis consisting of a layer of cells which are isodiametric or subisodiametric, 25-44 x 28-34 μ , filled with dissolved intracellular brown pigment without pigment condensations.

On rotten wood of twigs in subtropical forest, fruiting in spring.

ARGENTINA: Prov. Misiones: Dpto. Iguazú, Cataratas del Iguazú, Singer & Digilio M 87 (LIL, MICH).

Both this and the preceding species might be compared with the form of *P. nanus* which is now being described as a new European species, *Pluteus satur*, as far as specimens without any veins are concerned. However, these do not show the rimosity or the sulcate margin of the South American species and differ likewise in growing on the earth.

SPECIES INCOMPLETELY KNOWN AND EXCLUDED

PLUTEUS ARGENTINUS Speg., An. Mus. Nac. B.A. **6**: 118. 1899.

This type is preserved. The specimens belong to the family Agaricaceae (see Singer, Lilloa **23**: 203. 1950, appeared 1951).

PLUTEUS BRUNNEOPICTUS (Berk. & Br.) Sacc. sensu Rick, l.c.

This might be *P. umbrinoalbidus*, *P. rimosoaffinis*, or any species of stirps *Pulverulentus*, *Jamaicensis*, or *Tucumanus*. Material truly identical with the Asiatic *P. brunneopictus* has not yet been found in South America.

PLUTEUS CERVINUS (Schaeff. ex Secr.) Kummer sensu Rick, l.c. p. 99.

This species is obviously not the European-North American form but apparently a mixture of *P. xylophilus* and *P. viscidulus*.

PLUTEUS CERVINUS var. *GRISEOVIRIDIS* Henn., Hedwigia **43**: 204. 1904.

Specimens do not seem to be available. They were probably destroyed. However, the grayish green color of the pileus, together with the typical metuloids of the section *Pluteus* such as described, indicate a good species in one of the stirpes of that section. Since nothing is known about clamp connections, we have to wait for rediscovery of the species before it can be inserted. It came originally from the Serra Cantareira, São Paulo, Brazil.

PLUTEUS CRISTATULUS Rick, Lilloa **3**: 445. 1938.

This new species from Rio Grande do Sul, Brazil, is a *nomen dubium* and specimens are not in existence.

PLUTEUS EXIGUUS Pat. sensu Rick, Lilloa **3**: 446. 1938.

I have not seen specimens. Might be almost anything. A specimen labeled "*P. exiguus* var. *venosa*" by Rick is probably *P. jamaicensis* or *P. fluminensis*.

PLUTEUS EXIMIUS (Saund. & Smith) Rick, Lilloa **3**: 445. 1938.

This is, as Rick indicates, surely a luxuriant form or microspecies of the sect. *Pluteus* (Cervinus-group).

PLUTEUS FIBRILLOSUS Rick, Lilloa **3**: 444. 1938, (non Murrill 1917).

This is a homonym. Specimens are not preserved. This is a *nomen dubium*. It is possible that Rick had *P. subfibrillosus*.

PLUTEUS GIGANTEUS Mass., Journ. Bot. **34**: 152. 1896.

The type (Jenmann 3596 from Georgetown, British Guayana, December 1886) is preserved (K). This is not a *Pluteus*, but rather a sterile or substerile tricholomataceous species. It does not grow on wood. The trama is regular.

PLUTEUS GRANULATUS Bres. sensu Rick, l.c.

This species is a rare Central European species. Its occurrence in South America is improbable and must be a misidentification.

PLUTEUS HISPIDULUS (Fr.) Gillet sensu Rick, l.c.

This may be some species of stirps *Fuliginosus* or a related group.

PLUTEUS LEONINUS (Schaeff, ex Fr.) Kummer sensu Rick, Lilloa **3**: 442. 1938.

This species does not occur spontaneously in South America as described by Rick, but may have been introduced from Europe or, more probably, represents a misdetermination on the part of Rick who might have confused it with *P. chrysophlebius* ssp. *bruchii* or another yellow species.

PLUTEUS LEPTONIA Rick, Lilloa **3**: 445. 1938.

The type, or what appears to be the type of this species (no. 14525, Colegio Anchieta) from Rio Grande do Sul, Brazil, is (erroneously) labeled *Pluteus leptonioides* Rick. It was collected at São Leopoldo in 1936. The spores are typical *Rhodophyllus* spores. This may be the same thing as the species described and illustrated recently by Baker & Dale as *Nolanea howellii* Peck. If not identical with this, it should be transferred to the genus *Acurtis* (= *Rhodophyllus* Quél., *Entoloma* sensu Donk).

PLUTEUS MELANODON (Secr.) Sacc. sensu Rick, l.c. p. 443.

This is a species not fully understood in Europe. It may be any of the dark-edged *Plutei*, or even an *Acurtis* (*Rhodophyllus*) species.

PLUTEUS NANUS (Pers. ex Fr.) Kummer sensu Rick, l.c. p. 444.

The exact identification of this species is difficult in Europe. It is impossible to state in what sense Rick accepted it. It is certainly not in Fries's sense since the spores are "4 μ and spheric".

PLUTEUS PELLITUS (Pers. ex Fr.) Kummer sensu Rick, l.c.

This is obviously *P. viscidulus*.

PLUTEUS PHLEBOPHORUS (Ditmar ex Fr.) Kummer sensu Rick, l.c.

This is perhaps *P. jamaicensis* Murr.

PLUTEUS SCRUPOSUS Henn., Hedwigia 41: 136. 1900.

Specimens do not seem to be available. They were probably destroyed. However, according to the description, it would appear that *P. scruposus* Henn. is a synonym of *Oudemansiella canarii* (Jungh.) Höhnelt. Hennings' material came from Cuyaba, Matto Grosso, Brazil.

PLUTEUS SENSITIVUS Rick, Broteria 24: 104. 1930.

There are no specimens in existence. The description is so poor, it does not even contain an indication of the color of the pileus. This is undoubtedly a *nomen nudum*. One collection from São Salvador, Rio Grande do Sul, Brazil, labeled *Pluteus sensitivus* var. *macrosporus* is actually a *Pluteus* sp. but hardly identical with the type.

PLUTEUS TERMITUM Henn., Hedwigia 43: 183. 1904.

Specimens do not seem to be available. They were probably destroyed. However, according to the description given by Hennings, this is rather an agaricaceous than an amanitaceous species, most probably a *Lepiota* which has lost its annulus. It was found on termite excavations at Fortaleza, Brazil.

PLUTEUS UMBROSUS (Pers. ex Fr.) Kummer sensu Rick, l.c. p. 99.

I have not studied the specimens. The description does not make it clear what species Rick had.

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